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Roswell Resource Area Draft Resource Management Plan/Environmental Impact Statement

Carlsbad Resource Area Draft Resource Management Plan Amendment/Environmental Impact Statement

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DRAFT
RESOURCE MANAGEMENT PLAN
ENVIRONMENTAL IMPACT STATEMENT

for the
Roswell Resource Area
Roswell, New Mexico

AND

DRAFT
RESOURCE MANAGEMENT PLAN AMENDMENT
ENVIRONMENTAL IMPACT STATEMENT

for the
Carlsbad Resource Area
Carlsbad, New Mexico

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Prepared by:

United States Department of the Interior
Bureau of Land Management
Roswell District
Roswell Resource Area
Carlsbad Resource Area
Roswell, New Mexico

September 1994

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BUREAU OF LAND MANAGEMENT
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IN REPLY
REFER TO:

1614 (066)

Dear Reader:

You are invited to assist the Bureau of Land Management (BLM) in a planning process that is important to accomplishing effective public land management in southeastern New Mexico. We ask for your participation in evaluating this combined draft of the Roswell Resource Management Plan/Environmental Impact Statement (RMP/EIS) and the Carlsbad Resource Management Plan Amendment/Environmental Impact Statement (RMPA/EIS). These draft plans have been prepared in conformance with land use planning procedures established by the Federal Land Policy and Management Act of 1976.

The draft RMP/EIS outlines alternatives for managing all uses of the public lands, including the federal mineral estate, in the Roswell Resource Area. The draft RMPA/EIS outlines alternatives for managing oil and gas exploration, development and production on public lands, including the federal mineral estate, in the Carlsbad Resource Area. These two land use plans have been combined in a single document to take advantage of similarities in the oil and gas resources of southeastern New Mexico and in the management of those resources.

There are five management alternatives described in this document, each with a different emphasis and each addressing the planning issues that were identified early in the planning process. The environmental consequences of implementing each of the alternatives have also been analyzed.

Your comments are invited on the alternatives and the adequacy of the impact analyses. Comments will be fully considered and evaluated in developing the Proposed RMP/RMPA and final environmental impact analysis. Comments are most useful when they address one or more of the following:

- errors in the analysis that has been performed;
- new information that would have a bearing on the analysis;
- misinformation that may have been used, which could affect the outcome of the analysis;
- requests for clarification;
- identification of a substantive new alternative that provides a different mix of allocations from any of the existing five alternatives.

Where possible, include in your comments references to the pages and paragraphs on which you are commenting. Substantive comments are most helpful.

Comments on this document will be accepted during a 90-day comment period beginning the day the notice of filing is published by the Environmental Protection Agency in the *Federal Register*. Open houses will be scheduled during the comment period to allow reviewers to discuss their comments or questions with the preparers of this document. The dates of the comment period and dates and locations of open houses will be widely advertised; each recipient of a copy of this document will be notified of those dates, as well.

Comments on this document should be addressed to:

David Stout, RMP/EIS Team Leader
Bureau of Land Management
Roswell District Office
1717 West 2nd Street
Roswell, New Mexico 88201
telephone: 505-627-0272

You should retain this Draft RMP/RMPA/EIS because of the possibility that the Proposed RMP/RMPA Final EIS will be published in abbreviated form. If that occurs, you will need this document for reference.

Through your participation in this effort, we can move forward toward a common goal of improved public land management in the Roswell and Carlsbad resource areas. We appreciate your interest in the multiple use management of BLM-administered lands.

Sincerely,

Leslie M. Cone

Leslie M. Cone
District Manager

ROSWELL RESOURCE MANAGEMENT PLAN ENVIRONMENTAL IMPACT STATEMENT FOR THE ROSWELL RESOURCE AREA, NEW MEXICO

and

CARLSBAD RESOURCE MANAGEMENT PLAN AMENDMENT ENVIRONMENTAL IMPACT STATEMENT FOR THE CARLSBAD RESOURCE AREA, NEW MEXICO

(X) DRAFT **( ) FINAL**

LEAD AGENCY: U.S. Department of the Interior, Bureau of Land Management

TYPE OF ACTION: Administrative

JURISDICTION: Quay, DeBaca, Guadalupe, Curry, Roosevelt, Lincoln, and a portion of Chaves counties in the Roswell Resource Area. Eddy, Lea and a portion of Chaves counties in the Carlsbad Resource Area.

ABSTRACT

This draft environmental impact statement (EIS) addresses alternative resource management plans for managing federal land and federal mineral estate in southeastern New Mexico. The area covered comprises about 3,687,000 acres of land in which the surface and minerals are federally owned and 10,338,000 acres in which only the minerals are federally owned ("split estate"). This public land is administered by the Bureau of Land Management, Roswell and Carlsbad resource areas, Roswell District, New Mexico.

Five alternatives have been considered. For the Roswell Resource Area, the alternatives represent comprehensive management of all resource values and resource uses in the planning area. For the Carlsbad Resource Area, the alternatives address the management of oil and gas resources and uses. One alternative is the continuation of present management (Alternative A). Three alternatives provide a variety of management choices ranging from an emphasis on environmental preservation or improvement of environmental values (Alternative B), to an emphasis on making resources and values of the public lands available for production and development (Alternative C), and an alternative balanced between environmental preservation and resource production and development (Alternative D). Alternative E is the BLM's Preferred Alternative, and is a combination of the other four alternatives. Alternative E attempts to provide as much environmental protection as possible while still meeting the BLM's multiple use mandates. The EIS also contains a section called "Management Common to All Alternatives" which, as the name indicates, is common management that is part of each of the alternatives. The various impacts that would be expected from implementing each of the alternatives are discussed in Chapter 4.

When the Roswell RMP and Carlsbad RMP Amendments are completed, they will provide comprehensive frameworks for managing the BLM-administered public lands and resources and for allocating their uses in the resource areas.

Comments on this document will be accepted for 90 days following the date that the Environmental Protection Agency publishes the Notice of Filing of this draft in the *Federal Register*.

Comments should be addressed to:

David Stout, RMP/EIS Team Leader
Bureau of Land Management
Roswell District Office
1717 West 2nd Street
Roswell, New Mexico 88201

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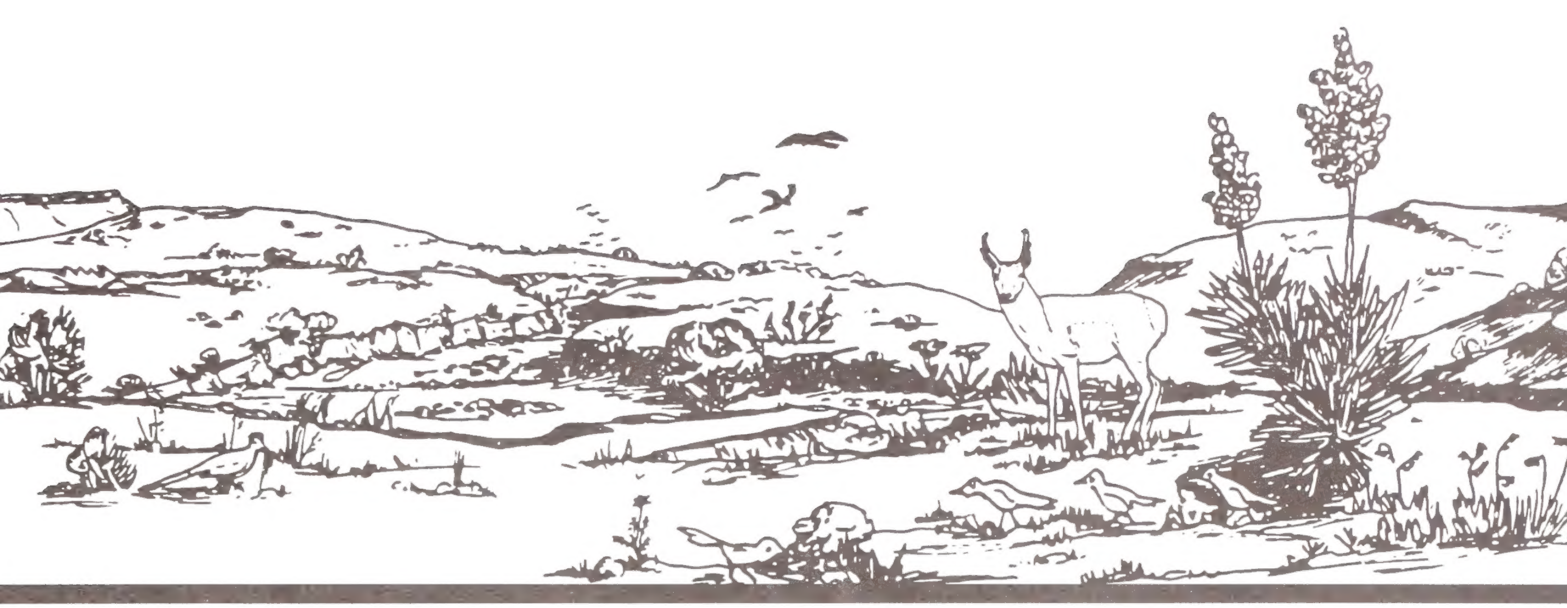
ACRONYMS

The following acronyms and abbreviations are used in this RMP.

ACEC	Area of Critical Environmental Concern
ADC	Animal Damage Control
AMP	Allotment Management Plan
APD	Application for Permit to Drill
AQB	Air Quality Bureau, New Mexico Environment Department
AQCR	Air Quality Control Regulation
AU	Animal Unit
AUM	Animal Unit Month
BACT	Best Available Control Technology
BLM	Bureau of Land Management
BMP	Best Management Practice
BOP	Blowout Preventer
BOR	Bureau of Reclamation
BRMA	Black River Management Area
CFR	Code of Federal Regulations
C&MU	Classification and Multiple Use Act
COA	Condition of Approval
CRA	Carlsbad Resource Area
CRMP	Coordinated Resource Management Plan
CSU	Controlled Surface Use
DDC	Drainages, Draws, Canyons (community)
DPC	Desired Plant Community
EA	Environmental Assessment
EB	Environmental Improvement Board, New Mexico
EIS	Environmental Impact Statement
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESI	Ecological Site Inventory
ET	Electrotelluric Surveying
FCRPA	Federal Cave Resources Protection Act
FEIS	Final Environmental Impact Statement
FHA	Farmers Home Administration
FHBMs	Flood Hazard Boundary Maps
FIL	Fire Intensity Level
FLPMA	Federal Land Policy and Management Act
FIRMs	Flood Insurance Rate Maps
GIS	Geographic Information System
GPR	Ground Penetrating Radar
HMM	Hazardous Materials Management
HMP	Habitat Management Plan
KGS	Known Geologic Structure
LWCP	Land and Water Conservation Fund
MDS	Mixed Desert Shrub (community)
MFP	Management Framework Plan
MFPA	Management Framework Plan Amendment
Mg/l	Milligrams per liter
Mph	Miles per hour
MSA	Management Situation Analyses
MI	Management Ignited
MOU	Memorandum of Understanding
MSM	Mixed Shrub Malpais (community)
NAAQS	National Ambient Air Quality Standards
NCA	National Conservation Area
NEPA	National Environmental Policy Act
NM	New Mexico
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environmental Department
NMOCD	New Mexico Oil Conservation Division
NMSO	New Mexico State Office
NNL	National Natural Landmark
NOI	Notice of Intent
NPS	Nonpoint Source Pollution
NSO	No Surface Occupancy
NTL	Notice to Lessee
OHV	Off-Highway Vehicle
ONA	Outstanding Natural Areas
PILT	Payment in Lieu of Taxes
PJ	Pinon-Juniper
PNF	Prescribed Natural Fire
Ppm	Parts per million
PSD	Prevention of Significant Air Quality Deterioration
RA	Resource Area
RDO	Roswell District Office
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
R&PP	Recreation and Public Purposes
ROS	Recreation Opportunity Spectrum
ROW	Right-of-Way
RRA	Roswell Resource Area
SASEM	Simple Approach Smoke Estimation Model
SCS	Soil Conservation Service
SEO	State Engineers Office, State of New Mexico
SHPO	State Historic Preservation Officer
SMA	Surface Management Agency
SOD	Shinnery-Oak Dune (community)
SRMA	Special Recreation Management Area
STC	Standard Terms and Conditions
SUOR	Surface Use and Occupancy Requirements
TDS	Total Dissolved Solids
T&E	Threatened and Endangered
TL	Timing Limitations
TRS	Total Reduced Sulfur
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VRCO	Vegetation Resource Condition Objectives
VRM	Visual Resource Management
WA	Wilderness Area
WHA	Wildlife Habitat Area
WSA	Wilderness Study Area
WQCC	Water Quality Control Commission



USER'S GUIDE

This document comprises two separate management plans: the Draft Roswell Resource Management Plan and Environmental Impact Statement (RMP/EIS) and the Draft Carlsbad Resource Management Plan Amendment and Environmental Impact Statement (RMPA/EIS).

The Draft Roswell RMP/EIS analyzes five alternative management options for all public land resource values and uses in the Roswell Resource Area. The Draft Carlsbad RMPA/EIS amends the existing Carlsbad RMP, which was approved in 1988. The Draft Carlsbad RMPA/EIS analyzes five alternative management options for oil and gas resources and use in the Carlsbad Resource Area.

The Draft Roswell RMP/EIS and the Draft Carlsbad RMPA/EIS have been combined in this document because of the similarities in oil and gas resources and the desire to standardize management of those resources between the resource areas. Individuals and businesses in the oil and gas industry who conduct business in both resources areas will be benefitted by standardizing the management of oil and gas resources.

This document is divided into five chapters and several appendixes, as well as miscellaneous sections, such as chapter summaries, List of Acronyms, Glossary, and References. This document contains the text, maps, and other information needed to assist the public and the BLM decision maker in choosing a comprehensive management plan for the next 20 years for the Roswell Resource Area, and for oil and gas management in the Carlsbad Resource Area.

The Summary presents a synopsis of the alternatives proposed and analyzed in the Draft RMP/EIS and Draft RMPA/EIS, and a synopsis of the impacts of those alternatives. It briefly describes each of the alternatives, including the BLM's Preferred Alternative, and summarizes the management actions proposed under each alternative.

Following the User's Guide is a list of Acronyms, to assist the reader. The list of Acronyms is at the front of the document to make it easier to find and use.

Chapter 1 is the discussion of the Purpose and Need for the document. This chapter includes descriptions of the purpose and need for preparing the RMP and RMPA, and of the planning area. It also includes discussions of the planning process and the planning issues and criteria.

Chapter 2 is the array of proposed alternative management options. Each of the five alternatives is prefaced by a general theme (e.g., emphasizing the preservation or improvement of important environmental values) that provides general guidance for the tone or emphasis of the alternative. Within each of the alternatives is the mix of proposed management actions that would address the issues identified in Chapter 1 and guide the management of the public lands over the next 20 years. Each alternative addresses proposed management for each public land resource or use (e.g., oil and gas management or cultural resource management). Chapter 2 also contains a section called "Management Common to All Alternatives," which, as the title suggests, is management that would be implemented under any alternative. Thus, a complete description of an alternative comprises both management actions common to all alternatives and specific management prescriptions for that alternative.

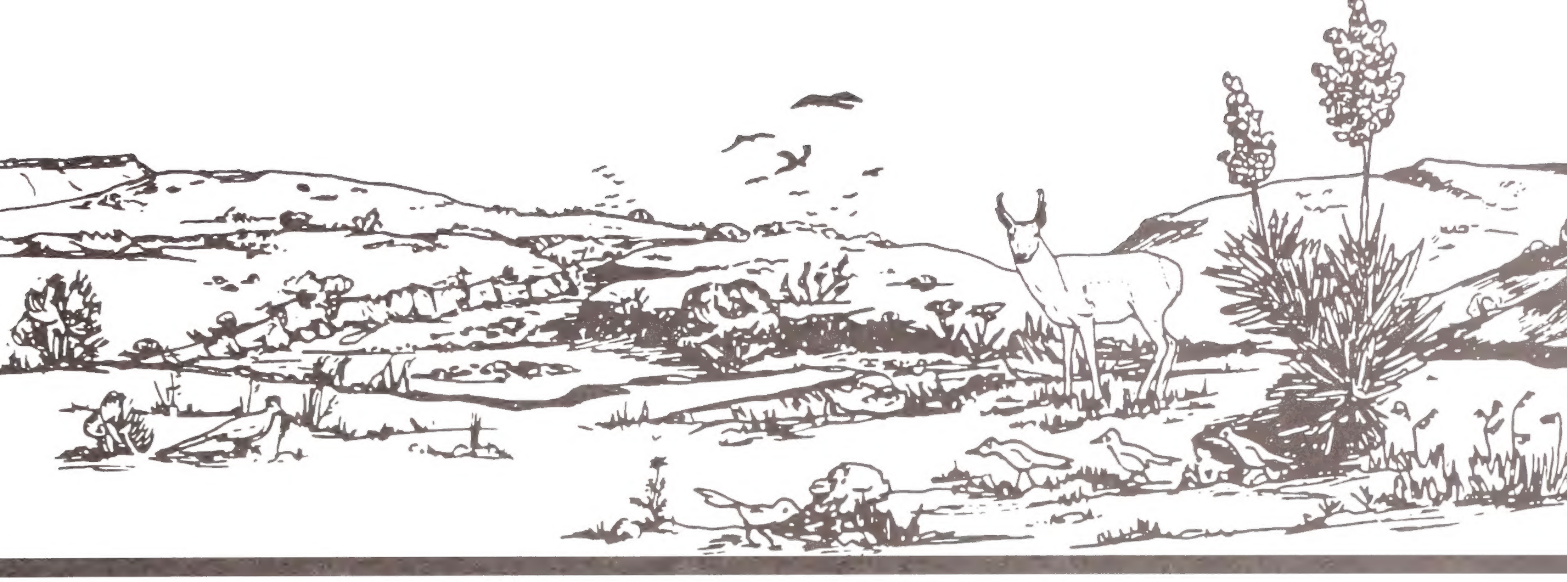
Chapter 3 is the description of the Affected Environment. This chapter describes the components of the existing environment that could be affected (either positively or negatively) by implementing any of the alternatives. The descriptions in this chapter are related to the issues identified in Chapter 1. Chapter 3 describes both resource values, such as water or vegetation, and resource uses, such as outdoor recreation.

Chapter 4 describes Environmental Consequences. The consequences are the potential effects of each of the alternatives described in Chapter 2 on the resource values and resource uses described in Chapter 3, if the proposed management actions were implemented. The discussions of potential impacts are arranged so that the impacts of each of the alternatives on a particular topic (e.g., wildlife habitat or watershed) are discussed and compared in the same section. Thus, in a single section, the reader can compare all the potential impacts to watershed, for example, from all the alternatives.

Chapter 5 is the description of the Consultation and Coordination efforts conducted by the BLM during the development of the draft RMP and RMPA. Included in Chapter 5 is a summary of public involvement opportunities. Chapter 5 also lists agencies, organizations, and individuals that the BLM either contacted (including those who received a copy of this document) or received input from during the preparation of this document. This chapter also lists the membership of the interdisciplinary team that prepared this document and other contributors to its development.

Appendixes follow Chapter 5. In some cases, the appendixes contain technical information that supplements text in the other chapters. In other cases, the appendixes contain information required by BLM planning procedures, but too voluminous to fit easily into the text. And, in still other cases, the appendixes contain detailed information describing how proposed management will be implemented. Examples of these appendixes are the "Rules of Conduct" for recreational use of public lands and the "Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas." Each appendix is prefaced by a brief description of its contents and purpose.

At the end of this document are the Glossary and References. The Glossary is especially useful, because of the large number of technical terms used in the text. The Glossary may be used in conjunction with the Acronym list in the front of this document, to help explain unfamiliar terms.



SUMMARY

INTRODUCTION

This draft resource management plan (RMP) and environmental impact statement (EIS) address future management options for oil and gas management on approximately 13,835,000 acres of federal mineral estate in the BLM's Roswell District, including about 2,197,000 acres in the Carlsbad Resource Area and about 1,490,000 acres in the Roswell Resource Area where the surface is in federal ownership, as well, and is administered by the BLM. Included in the more than 13.8 million acres of federal mineral estate are about 10.1 million acres where the surface is managed by other surface management agencies of the federal or New Mexico State governments or is in private ownership, and the leasing of fluid minerals (i.e., oil and gas) is administered by the BLM. The U.S. Forest Service prepares land use plans for the development of minerals on National Forests. The fluid mineral leasing and surface occupancy requirements from land use plans for the Lincoln and Cibola national forests have been incorporated in this document and are discussed in Chapter 2, under "Management Common to All Alternatives." Leasing and surface management requirements of the other affected federal and state agencies have been incorporated in that section, as well.

The plan also addresses future management options for the Roswell Resource Area for all other uses of the public lands, including management of minerals other than oil and gas, on about 1,490,000 acres of federal surface and minerals and about 8,405,000 acres of federal mineral estate.

The public lands described above, including the mineral estate, are administered by the Bureau of Land Management through its Carlsbad and Roswell resource area offices. The Carlsbad Resource Area encompasses Lea and Eddy counties, and the "bootheel" of Chaves County, all in southeastern New Mexico. The Roswell Resource Area encompasses the remainder of Chaves County and all of Lincoln, DeBaca, Roosevelt, Curry, Quay, and Guadalupe counties in southeastern and east-central New Mexico. The Roswell District comprises the two resource areas.

When completed, the Roswell RMP and the Carlsbad RMP Amendment will provide frameworks for managing the public lands and resources, and allocating their uses. Specifically, this RMP/EIS is focused primarily on resolving key resource management issues. For both the Roswell and Carlsbad resource areas, the plan addresses the key issue of oil and gas operations. For the Roswell Resource Area, the plan addresses the key issues of land tenure adjustment, access, and special management areas. For the Roswell Resource Area, the plan also addresses management opportunities for recreation and wildlife habitat management.

SUMMARY OF ALTERNATIVES

Five planning alternatives are analyzed in detail in this document. All the alternatives are oriented to multiple use. Each alternative provides for resource production and environmental protection. Table 1 is a summary comparison of the management prescriptions in the five alternatives for the Carlsbad Resource Area. Table 2 summarizes and compares the management prescriptions for the Roswell Resource Area. Because Tables 1 and 2 are only summaries, the reader should carefully read Chapter 2 (Alternatives) for details of proposed management and not rely on the tables as the sole source of information about the alternatives.

Alternative A is the continuation of current management where the existing land management and uses of public lands and resources would continue at their present levels. Alternative A also is the "no action" alternative required by Council on Environmental Quality regulations. For the Carlsbad Resource Area, management would be directed by the Carlsbad RMP. For the Roswell Resource Area, management would be based on existing guidance, including the Roswell District Oil and Gas Environmental Assessment

Alternative B emphasizes preserving or improving important environmental values. It still provides for use of resources and values provided the goals of this alternative can be met.

Alternative C emphasizes making the resources and values of the public lands available for production and development. While the emphasis is on production, it still provides for environmental protection.

Alternative D is more balanced than the other alternatives. It attempts to support the use and development of public land resources and values while maintaining or improving important environmental values.

Alternative E (the Preferred Alternative) comprises parts of the other alternatives in a mix that attempts to provide as much environmental protection as possible while still meeting the BLM's multiple use mandates. This alternative is more environmentally oriented than either Alternative A or C. It is more production oriented than Alternative B. Alternative E is slightly more oriented toward environmental protection than Alternative D.

The elements of the environment that are affected by the management prescriptions in the five alternatives are described in Chapter 3.

The environmental consequences that could result from the management prescriptions in the five alternatives are described in Chapter 4. Table 3 summarizes the significant impacts of those management prescriptions on the natural resources of the two resource areas, or on the uses of those resources.

TABLE 1
SUMMARY OF ALTERNATIVES
Carlsbad Resource Area

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CARLSBAD OIL & GAS	Close about 89,457 acres to oil and gas leasing.	Close about 127,593 acres to oil and gas leasing.	Close about 87,012 acres to oil and gas leasing.	Close about 105,577 acres to oil and gas leasing.	Close about 107,097 acres to oil and gas leasing.
	Allow oil and gas leasing with No Surface Occupancy on about 92,313 acres.	Allow oil and gas leasing with No Surface Occupancy on about 62,247 acres.	Allow oil and gas leasing with No Surface Occupancy on about 65,007 acres.	Allow oil and gas leasing with No Surface Occupancy on about 82,667 acres.	Allow oil and gas leasing with No Surface Occupancy on about 81,147 acres.
	Allow oil and gas leasing with timing restrictions on about 195,462 acres.	Allow oil and gas leasing with controlled surface use and Surface Use and Occupancy Requirements on about 3,905,214 acres.	Allow oil and gas leasing with controlled surface use and Surface Use and Occupancy Requirements on about 3,942,981 acres.	Allow oil and gas leasing with controlled surface use and Surface Use and Occupancy Requirements on about 3,909,576 acres.	Allow oil and gas leasing with controlled surface use and Surface Use and Occupancy Requirements on about 3,906,756 acres.
	Allow oil and gas leasing subject to standard terms and conditions on about 3,573,704 acres.	No similar action	No similar action	No similar action	No similar action
	Allow oil and gas leasing subject to controlled surface use restrictions on 119,922 acres.				
	Apply Standard Conditions of Approval to the development of new and existing leases.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Require oil and gas pipelines to be buried. Waivers allowed in some situations.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Continue to lease portions of the potash area subject to the Potash Stipulation.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Manage Dark Canyon Scenic Area and ACEC, Manhole Cave and Mudgetts Cave in accordance with the decision in the Final Dark Canyon EIS (1994).	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
OIL & GAS (continued)	Continue to use lease notices to alert lessees to potential special requirements on exploration, drilling or production.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
SALABLES	No similar action	Mineral material pits no longer in use or selected pits in areas with a high density of pits would be reclaimed.	Existing pit locations would not be closed until material is depleted unless pit is causing environmental degradation.	Same as Alternative C	Same as Alternative B
CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT	Continue to require cultural inventory surveys for surface disturbing activities involving federal actions. Continue to protect sites or mitigate damages to NRHP eligible and potentially eligible sites.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
CAVE AND KARST RESOURCE MANAGEMENT	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Move drilling locations up to 200 meters from cave entrances or significant karst features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Allow No Surface Occupancy within up to 400 meters of known cave entrances, passages, or aspects of significant caves or karst features; or within up to 200 meters of other caves and features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Surface use and occupancy would be controlled within up to 200 meters of known cave entrances, passages, or aspects of significant caves or karst features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Allow No Surface Occupancy within up to 200 meters of known cave entrances, passages, or aspects of significant caves or karst features.	Same as Alternative D

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CAVE AND KARST RESOURCE MANAGEMENT (continued)	Continue records review and field inventory as primary cave and karst detection method. Use cave exploration as means to gain additional data as necessary.	Continue records review and field inventory for cave and karst detection. Use cave exploration as means to gain additional data as necessary. Apply other detection methods as appropriate based on results of initial detection efforts and potential significance of cave or karst.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Continue to apply surface mitigations, to include: use of a closed system or steel tanks; relocation of pits; construction of berms to contain spills; installation of leak detection systems; use of permanent liners in storage tank areas; use of differential pressure shut-off valves; use of corrosion-inhibiting coatings and cathodic protection; flaring rather than venting of gas; and use of stock tank vapor recovery systems.	Apply surface mitigations, to include: use of a closed system or steel tanks; use of modified "V" pit below ground level with extra heavy pit liners; relocation of pits; construction of berms to contain spills; installation of leak detection systems; use of permanent liners in storage tank areas; use of differential pressure shut-off valves; use of corrosion-inhibiting coatings and cathodic protection; flaring rather than venting of gas; and use of stock tank vapor recovery systems.	Same as Alternative A	Same as Alternative B	Same as Alternative B

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
OIL & GAS (continued)	Continue to use lease notices to alert lessees to potential special requirements on exploration, drilling or production.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
SALABLES	No similar action	Mineral material pits no longer in use or selected pits in areas with a high density of pits would be reclaimed.	Existing pit locations would not be closed until material is depleted unless pit is causing environmental degradation.	Same as Alternative C	Same as Alternative B
CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT	Continue to require cultural inventory surveys for surface disturbing activities involving federal actions. Continue to protect sites or mitigate damages to NRHP eligible and potentially eligible sites.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
CAVE AND KARST RESOURCE MANAGEMENT	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Move drilling locations up to 200 meters from cave entrances or significant karst features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Allow No Surface Occupancy within up to 400 meters of known cave entrances, passages, or aspects of significant caves or karst features; or within up to 200 meters of other caves and features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Surface use and occupancy would be controlled within up to 200 meters of known cave entrances, passages, or aspects of significant caves or karst features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Allow No Surface Occupancy within up to 200 meters of known cave entrances, passages, or aspects of significant caves or karst features.	Same as Alternative D

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CAVE AND KARST RESOURCE MANAGEMENT (continued)	Continue records review and field inventory as primary cave and karst detection method. Use cave exploration as means to gain additional data as necessary.	Continue records review and field inventory for cave and karst detection. Use cave exploration as means to gain additional data as necessary. Apply other detection methods as appropriate based on results of initial detection efforts and potential significance of cave or karst.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Continue to apply surface mitigations, to include: use of a closed system or steel tanks; relocation of pits; construction of berms to contain spills; installation of leak detection systems; use of permanent liners in storage tank areas; use of differential pressure shut-off valves; use of corrosion-inhibiting coatings and cathodic protection; flaring rather than venting of gas; and use of stock tank vapor recovery systems.	Apply surface mitigations, to include: use of a closed system or steel tanks; use of modified "V" pit below ground level with extra heavy pit liners; relocation of pits; construction of berms to contain spills; installation of leak detection systems; use of permanent liners in storage tank areas; use of differential pressure shut-off valves; use of corrosion-inhibiting coatings and cathodic protection; flaring rather than venting of gas; and use of stock tank vapor recovery systems.	Same as Alternative A	Same as Alternative B	Same as Alternative B

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CAVE AND KARST RESOURCE MANAGEMENT (continued)	Apply subsurface mitigations where presence of caves or karst is obvious or expected based on detection efforts, or in lost circulation zones, to include: use of cable tool drilling techniques where caves or karst are expected at depths not greater than 350 feet; use fresh water mud or compressed air for rotary drilling; all casing to meet or exceed NACE specifications. BLM concurrence required for remedial actions to resolve problems with bit drops or lost circulation.	Apply subsurface mitigations where presence of caves or karst is obvious or expected based on detection efforts, or in lost circulation zones, to include: use of cable tool drilling techniques where caves or karst are expected at depths not greater than 350 feet; use fresh water mud or compressed air for rotary drilling; all casing to meet or exceed NACE specifications; use "cave protection" casing with thicker-than-normal walls across any caves encountered. Stop drilling operations if bit drops of four feet or more and circulation losses greater than 75% occur simultaneously; plug well if remedial cementing work cannot resolve problem. Cement casing in place using most environmentally sound methods. BLM concurrence required for remedial actions to resolve problems with bit drops or lost circulation.	Same as Alternative A	Same as Alternative B	Same as Alternative B

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CAVE AND KARST RESOURCE MANAGEMENT (continued)	No similar action	Require special monitoring in areas where caves or karst are obvious or expected, or in lost circulation zones. Require annual bradenhead tests on the annulus formed by the production casing and the cave protection casing.	No similar action	Same as Alternative B	Same as Alternative B
	Apply BLM standards for plugging and abandonment.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action	Require records related to drilling and cementing in cave or karst areas and lost circulation zones to be compiled and submitted to BLM.	No similar action	Same as Alternative B	Same as Alternative B
VISUAL RESOURCES	Require painting of all permanent surface facilities or equipment. Color of "Carlsbad Canyon" would normally be used.	Require painting of all permanent surface facilities or equipment. Paint colors would be selected to blend with surrounding landscape.	Require painting of all permanent surface facilities or equipment in Class II VRM zones. Painting would also be required in some Class III areas. Color of "Carlsbad Canyon" would normally be used.	Same as Alternative C, except that colors would be selected to blend with surrounding landscape.	Same as Alternative B
WILDLIFE HABITAT MANAGEMENT	Continue to move oil & gas drilling locations up to 200 meters as necessary to protect wildlife projects.	Allow No Surface Occupancy within up to 400 meters of existing or planned wildlife improvement projects.	Allow No Surface Occupancy within up to 200 meters of existing or planned wildlife improvement projects.	Same as Alternative C	Same as Alternative C
	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken habitat between April 1 and May 31.	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken habitat between March 1 and June 30. No new drilling allowed within up to 400 meters of leks.	Same as Alternative A	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken core habitat between March 1 and May 31. No new drilling allowed within up to 200 meters of leks.	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken habitat between April 1 and May 31. No new drilling allowed within up to 400 meters of leks.

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WILDLIFE HABITAT MANAGEMENT (continued)	No similar action	Allow No Surface Occupancy in suitable Dune Sagebrush Lizard Habitat.	Allow No Surface Occupancy in specific areas where Dune Sagebrush Lizard occurrences have been documented. Consider relocation of proposal of up to 200 meters to avoid these areas.	Allow No Surface Occupancy in occupied Dune Sagebrush Lizard habitat, or in suitable isolated dunes or contiguous dune complexes.	Allow No Surface Occupancy in occupied Dune Sagebrush Lizard habitat.
Raptor Habitat Management	Continue to move oil & gas drilling locations up to 200 meters as necessary to protect heronries or raptor nests.	Allow No Surface Occupancy within up to 400 meters of active heronries. Allow No Surface Occupancy within up to 400 meters of raptor nests on natural habitat features and/or delay activity for up to 90 days.	Allow No Surface Occupancy within up to 200 meters of active heronries. Allow No Surface Occupancy within up to 200 meters of raptor nests on natural habitat features and/or delay activity for up to 60 days.	Same as Alternative C	Allow No Surface Occupancy within up to 200 meters of active heronries. Allow No Surface Occupancy within up to 200 meters of raptor nests on natural habitat features and/or delay activity for up to 90 days.
WATERSHED	Where soils and nontarget vegetation are disturbed, reclamation measures would be taken as appropriate.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Allow new roads or trails to be constructed only if existing roads and trails cannot be used.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Soil Management	No similar action	Allow no occupancy or use on slopes over 10%. Allow occupancy or use on fragile soils on case by case basis.	Allow no occupancy or use on slopes over 30% except with BLM approved plan of operations and development. Allow occupancy or use on fragile soils on case by case basis.	No occupancy or use on slopes over 20%. Allow occupancy or use on fragile soils on case by case basis.	Same as Alternative D

TABLE 1 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WATERSHED (continued) Surface Water Management: Quality	Continue to move oil and gas drilling locations up to 200 meters from floodplains as necessary.	Allow No Surface Occupancy within up to 400 meters of the outer edge of 100-year floodplains.	Allow occupancy and use in floodplains based on a BLM approved plan of operation.	Allow No Surface Occupancy within floodplains and within up to 200 meters of the outer edge of 100-year floodplains.	Same as Alternative D
	Continue to move oil and gas drilling locations up to 200 meters from playas/alkali lakes as necessary.	Allow No Surface Occupancy within up to 400 meters of playas/alkali lakes.	Allow No Surface Occupancy within playas/alkali lakes.	Allow No Surface Occupancy within up to 200 meters of playas/alkali lakes. Exceptions considered with mitigation.	Same as Alternative D
	Continue to move proposed oil and gas drilling locations up to 200 meters from springs and seeps as necessary.	Allow No Surface Occupancy within up to 400 meters of springs/seeps or within up to 200 meters of downstream riparian areas. Allow No Surface Occupancy within up to 400 meters of earthen tanks or riparian areas created by tanks.	Allow No Surface Occupancy within up to 200 meters of springs/seeps or within downstream riparian areas. Allow No Surface Occupancy within up to 200 meters of earthen tanks or riparian areas created by tanks.	Allow No Surface Occupancy within up to 200 meters of springs/seeps or within up to 200 meters of downstream riparian areas. Allow No Surface Occupancy within up to 200 meters of earthen tanks or riparian areas created by tanks.	Same as Alternative C

TABLE 2
SUMMARY OF ALTERNATIVES
Roswell Resource Area

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
ALL PROGRAMS	No similar action. Although many of the restrictions were applied on a case by case basis.	Apply Surface Use and Occupancy Requirements for Alternative B to all surface disturbing activities.	Apply Surface Use and Occupancy Requirements for Alternative C to all surface disturbing activities.	Apply Surface Use and Occupancy Requirements for Alternative D to all surface disturbing activities.	Apply Surface Use and Occupancy Requirements for the Preferred Alternative to all surface disturbing activities.
MINERALS Oil and Gas	Close about 360,352 acres to oil and gas leasing.	Close about 402,129 acres to oil and gas leasing.	Close about 367,084 acres to oil and gas leasing.	Close about 388,438 acres to oil and gas leasing.	Close about 398,749 acres to oil and gas leasing.
	Allow oil and gas leasing with No Surface Occupancy on about 22,329 acres.	Allow oil and gas leasing with No Surface Occupancy on about 22,034 acres.	Allow oil and gas leasing with No Surface Occupancy on about 56,903 acres.	Allow oil and gas leasing with No Surface Occupancy on 37,612 acres.	Allow oil and gas leasing with No Surface Occupancy on about 28,913 acres.
	Allow oil and gas leasing with controlled Surface Use Stipulations on about 12,105 acres. Allow oil and gas leasing with timing restriction on 935,000 acres.	Allow oil and gas leasing with controlled Surface Use stipulations on about 1,320 acres.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action.	Allow oil and gas leasing with Surface Use and Occupancy Requirements on about 9,315,837 acres.	Allow oil and gas leasing with Surface Use and Occupancy Requirements on about 9,316,013 acres.	Allow oil and gas leasing with Surface Use and Occupancy Requirements on about 9,313,950 acres.	Allow oil and gas leasing with Surface Use and Occupancy Requirements on about 9,312,338 acres.
	Allow oil and gas leasing subject to standard terms and conditions on about 8,410,390 acres.	No similar action	No similar action	No similar action	No similar action
Locatables	Retain withdrawal of 53,051 acres from locatable mineral entry.	Withdraw 114,414 acres from locatable mineral entry. Included are lands within 400 meters of the source of springs and seeps, and within 200 meters on either side of downstream riparian areas.	Withdraw 110,724 acres from locatable mineral entry. Included are lands within 200 meters of the source of springs and seeps, and within downstream riparian areas.	Withdraw 114,304 acres from locatable mineral entry. Included are lands within 200 meters of the source of springs and seeps, and within 200 meters on either side of downstream riparian areas.	Withdraw 116,024 acres from locatable mineral entry.

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
MINERALS (continued) Solid Leasables	Close 281 acres to solid mineral leasing.	Close 101,194 acres to solid mineral leasing.	Close 100,371 acres to solid mineral leasing.	Close 103,431 acres to solid mineral leasing.	Close 97,024 acres to solid mineral leasing.
Salables	No similar action outside proposed ACEC's.	Close 97,293 acres to mineral material disposal.	Close 66,458 acres to mineral material disposal.	Close 69,758 acres to mineral material disposal.	Close 70,458 acres to mineral material disposal.
	No similar action	Mineral material pits no longer in use or selected pits in areas with a high density of pits would be reclaimed.	Existing pit locations would not be closed until material is depleted unless pit is causing environmental degradation.	Same as Alternative C	Same as alternative B
LANDS AND REALTY Utility/Transportation System	Exclude major R/W on about 37,156 acres.	Exclude major R/W on about 340,955 acres.	Exclude major R/W on about 53,573 acres.	Exclude major R/W on about 93,095 acres.	Exclude major R/W on about 93,455 acres.
	No similar action	Avoid R/W on 310,833 acres.	Avoid major R/W on 313,561 acres.	Avoid major R/W on 250,649 acres.	Avoid major R/W on about 253,125 acres.
Acquisition	Acquire 963 acres within the Overflow Wetlands Wildlife Habitat Area (WHA).	Acquire about 95,600 acres of non-federal lands or interests therein.	Acquire up to 56,000 acres of non-federal lands or interests therein.	Same as Alternative B	Acquire up to 93,000 acres of non-federal lands or interests therein.
	Acquire up to 2,000 acres along the Rio Bonito.	Acquire up to 3000 acres along the Rio Bonito.	Same as Alternative B	Same as Alternative B	Same as Alternative B
Disposal	Dispose of 3,155 acres of public land.	Dispose of up to 150,000 acres of public lands.	Same as Alternative B	Same as Alternative B	Same as Alternative B
LIVESTOCK	Continue to use allotment categorization and use allocations from East Roswell Grazing EIS and Roswell MFP as basis for livestock grazing. Changes in use allocations to be based on monitoring data.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
LIVESTOCK (continued)	Initiate or revise about three Allotment Management Plans annually.	Revise or develop and implement Allotment Management Plans (AMP) to achieve Desired Plant Community Objectives with emphasis on wildlife habitat, and watershed.	Revise or develop and implement Allotment Management Plans (AMP) to achieve Desired Plant Community Objectives. Emphasis will be placed on preparing plans on all "I" Category Allotments and on "M" Category Allotments where conditions warrant.	Revise or develop and implement Allotment Management Plans (AMP) to achieve Desired Plant Community Objectives with emphasis on livestock, wildlife habitat and watershed. Emphasis will be placed on preparing plans on all "I" Category Allotments and on "M" Category Allotments where conditions warrant.	Same as Alternative D
VEGETATION MANAGEMENT	Maintain or increase vegetative composition and production to achieve the Ecological Range Site Goals.	Achieve the Desired Plant Community, with an emphasis on wildlife, and watershed.	Achieve the Desired Plant Community with an emphasis on livestock.	Achieve the Desired Plant Community with an emphasis on watershed, wildlife habitat management, and livestock production.	Same as Alternative D
	Allow mechanical control on approximately 17,477 acres. Allow chemical control on approximately 225,610 acres. Allow burn treatments on approximately 105 acres.	Develop projects to meet DPC based on thresholds and vegetation condition objectives for each community type.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Utilization levels would not exceed 45 percent of annual plant production.	Except on Rio Bonito acquired lands, utilization levels would not exceed 40 percent of annual plant production.	Utilization levels would not exceed 50 percent of annual plant production.	Same as Alternative A	Same as Alternative A
	No similar action	Allow no chemical treatments.	Allow no chemical treatments until chemical treatment of an adjacent project in place three years. No re-treatment of area with chemicals within 10 years of initial treatment.	Allow no chemical control except for salt cedar, and then only if chemicals are applied by hand.	Allow no chemical treatments until chemical treatment of adjacent project in place five years. No re-treatment of area with chemicals within 15 years of initial treatment.

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT	No similar action	Nominate 3,400 acres at Haystack Butte for a National Register District. Acquire up to 680 acres. Close the 3,400 acres to mineral material disposal, oil and gas leasing, and solid mineral leasing. Withdraw the area from locatable mineral entry.	Same as Alternative B except allow oil and gas leasing with No Surface Occupancy.	Same as Alternative C	Same as Alternative B
	No similar action	Nominate 3,000 acres at Cocklebur Lakes for a National Register District. Close the 3,000 acres to mineral material disposal, oil and gas leasing, and solid mineral leasing. Withdraw the area from locatable mineral entry.	Same as Alternative B except close the 3,000 acres to mineral material disposal and solid mineral leasing. Allow oil and gas leasing with No Surface Occupancy. Withdraw the area from locatable mineral entry.	Same as Alternative C	Same as Alternative B
	Stabilize, interpret and protect 120 acres of public land at the Garnsey bison Kill Site.	Stabilize, interpret and protect the Garnsey bison Kill Site. (360 acres) Acquire 520 acres to add to the site.	Same as Alternative A	Same as Alternative B	Same as Alternative B
	No similar action	Identify the location for the alleged 1947 UFO crash site(s). Protect and interpret the area(s) by excluding rights-of-way; withdrawing from locatable mineral entry and closing to leasable minerals.	Identify the location for the alleged 1947 UFO crash site(s). Protect and interpret the area(s) by excluding rights-of-way; withdrawing from locatable mineral entry and closing to leasable minerals. Establish access and interpretive facilities.	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
RECREATION	No similar action	Allow oil and gas leasing with No Surface Occupancy in the Border Hills, Haystack Mountain OHV area, Mescalero Sands North Dune OHV area, Valley of Fires and Billy the Kid Recreation areas.	Same as Alternative B	Allow oil and gas leasing with No Surface Occupancy in the Border Hills, Haystack Mountain OHV area, Mescalero Sands North Dune OHV area, and Valley of Fires.	Same as Alternative B
	No similar action	Withdraw the Little black Peak and Carrizozo Lava Flow WSA's, Border Hill, Haystack Mountain OHV area, and Valley of Fires from entry under the mining law.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Continue to maintain and develop existing recreation facilities at the Valley of Fires Recreation Area and Mescalero North Sand Dunes OHV Area.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Manage Rio Bonito acquired lands (Tracts 1-4) for low intensity recreational use.	Same as Alternative A, and consider development of a day use area on Tract 5.	Manage Rio Bonito acquired lands (Tracts 1-4) for facility based, intensive recreational use. Consider development of a full-service campground in Tract 5.	Manage Rio Bonito acquired lands (Tracts 1-4) for low intensity recreational use. Consider development of a full-service campground in Tract 5.	Same as Alternative D
	Close the Rio Bonito acquired lands to the use of weapons.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
RECREATION (continued) Cave and Karst Resource Management	Continue to manage permitted caves in accordance with existing cave management plans.	Establish visitor use limits, seasons of use, and a permit system for all significant caves with public land entrances.	Establish visitor use limits and a permit system on all gated and/or fragile caves. Establish seasons of use and visitor use restrictions on other caves or portions of caves with significant bat hibernacula or nurseries.	Same as Alternative B	Establish visitor use limits, seasons of use, and a permit system for all caves with public land entrances where cave resources are being affected by visitor use.
	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Move drilling locations up to 200 meters from cave entrances or significant karst features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Allow No Surface Occupancy within up to 400 meters of known cave entrances, passages, or aspects of significant caves or karst features; or within up to 200 meters of other caves and features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Surface use and occupancy would be controlled within up to 200 meters of known cave entrances, passages, or aspects of significant caves or karst features.	Apply the Cave/Karst Lease Notice to all oil and gas leases issued in potential cave or karst areas. Allow No Surface Occupancy within up to 200 meters of known cave entrances, passages, or aspects of significant caves or karst features.	Same as Alternative D
	Continue records review and field inventory as primary cave and karst detection method. Use cave exploration as means to gain additional data as necessary.	Continue records review and field inventory for cave and karst detection. Use cave exploration as means to gain additional data as necessary. Apply other detection methods as appropriate based on results of initial detection efforts and potential significance of cave or karst.	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
RECREATION (continued) Cave and Karst Resource Management (continued)	Continue to apply surface mitigations, to include: use of a closed system or steel tanks; relocation of pits; construction of berms to contain spills; installation of leak detection systems; use of permanent liners in storage tank areas; use of differential pressure shut-off valves; use of corrosion-inhibiting coatings and cathodic protection; flaring rather than venting of gas; and use of stock tank vapor recovery systems.	Apply surface mitigations described in Alternative A, plus other mitigations including use of modified "V" pit below ground level with extra heavy pit liners.	Same as Alternative A	Same as Alternative B	Same as Alternative B
	Apply subsurface mitigations where presence of caves or karst is obvious or expected based on detection efforts, or in lost circulation zones, to include: use of cable tool drilling techniques where caves or karst are expected at depths not greater than 350 feet; use fresh water mud or compressed air for rotary drilling; all casing to meet or exceed NACE specifications. BLM concurrence required for remedial actions to resolve problems with bit drops or lost circulation.	Apply subsurface mitigations described in Alternative A, plus other mitigations including use "cave protection" casing with thicker-than-normal walls across any caves encountered. Stop drilling operations if bit drops of four feet or more and circulation losses greater than 75% occur simultaneously; plug well if remedial cementing work cannot resolve problem. Cement casing in place using most environmentally sound methods.	Same as Alternative A	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
RECREATION (continued) Cave and Karst Resource Management (continued)	No similar action	Require special monitoring in areas where caves or karst are obvious or expected, or in lost circulation zones. Require annual bradenhead tests on the annulus formed by the production casing and the cave protection casing.	No similar action	Same as Alternative B	Same as Alternative B
	Apply BLM standards for plugging and abandonment.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action	Require records related to drilling and cementing in cave or karst areas and lost circulation zones to be compiled and submitted to BLM.	No similar action	Same as Alternative B	Same as Alternative B
Off-Highway Vehicle (OHV) Management	Retain the "open" to off-highway vehicle use designation on approximately 400,000 acres in the East Chaves Planning Unit.	All public lands not otherwise designated would be designated as "limited" to existing roads and trails for off-highway vehicle use.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Continue to designate Wilderness Study Areas (Little Black Peak and Carrizozo Lava Flow) as being "limited" to existing roads and trails for off-highway vehicle use until the WSAs are designated as wilderness or are released from wilderness consideration.	Close the Carrizozo Lava Flow and Little Black Peak WSAs (25,312 acres) to off-highway vehicle use.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
RECREATION (continued) Off-Highway Vehicle (OHV) Management (continued)	Retain the "limited to designated trails and active dunes designation on 610 acres in the Mescalero Sands North Dune OHV area.	Designate the Mescalero Sands North Dune OHV Area (610 acres) as "Open" to OHVs.	Enlarge the Mescalero Sands North Dune OHV Area to about 1,546 acres, and designate it as "Open" to OHV use. Acquire up to 410 acres of private land.	Same as Alternative C	Same as Alternative C
	Retain the "limited to existing roads and trails for motorcycle use" designation for the Haystack Mountain OHV area (about 3,500 acres).	Designate about 3,500 acres at the Haystack Mountain OHV Area as "limited" to designated roads for All Terrain Vehicles less than 50 inches in width. Acquire access to the northern portion of the OHV area.	Enlarge the Haystack Mountain OHV Area to about 6,826 acres, and designate 4,173 acres of BLM surface "limited" to designated roads for All Terrain Vehicles less than 50 inches in width. Acquire about 1,453 acres of state lands and 1,200 acres of private lands.	Same as Alternative C	Designate about 3,500 acres as "limited" to designated roads for All Terrain Vehicles less than 50 inches in width. Acquire access to the northern portion of the OHV area.
	No similar action	No similar action	Designate a 640-acre area in the Dunahoo Hills for OHV use and designate it "limited" to use by All Terrain Vehicles (ATV's) less than 50".	Same as Alternative C	Same as Alternative C
	No similar action	Designate approximately 19,200 acres of public lands in floodplains, and riparian and wetland areas along both sides of the Pecos River as "closed" to OHV use.	Designate approximately 19,200 acres of public lands along both sides of the Pecos River as "limited" to designated roads and trails for OHV use.	Same as Alternative C	Same as Alternative C
	No similar action	Designate approximately 16,400 acres encompassing playas and alkali lakes, and the area within 400 meters of playas and alkali lakes as "closed" to OHV use.	Designate approximately 2,000 acres encompassing playas and alkali lakes "closed" to OHV use.	Designate approximately 7,400 acres encompassing playas and alkali lakes, and the area within 200 meters of playas and alkali lakes as "closed" to OHV use.	Designate approximately 2,000 acres encompassing playas and alkali lakes, and the area within 200 meters of playas and alkali lakes as "closed" to OHV use.

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
RECREATION (continued) Off-Highway Vehicle (OHV) Management (continued)	No similar action	Designate approximately 950 acres encompassing the area within 400 meters of the source of a spring or seep, and within 200 meters on either side of downstream riparian area as "closed" OHV use.	Approximately 240 acres encompassing the area within 200 meters of the source of a spring or within downstream riparian areas as designated "closed" to OHV use.	Approximately 760 acres encompassing the area within 200 meters of the source of a spring or seep, and within 200 meters on either side of downstream riparian areas as "closed" to OHV use.	Designate approximately 240 acres encompassing the area within 200 meters of the source of a spring or seep, or within downstream riparian areas as "closed" to OHV use.
Wilderness Management	Close the Little Black Peak and Carrizozo Lava Flow WSA's to oil and gas leasing.	Same as alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Acquire up to 10,000 acres to enhance the Little Black Peak and Carrizozo Lava Flow WSAs.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action	No similar action	No similar action	Develop trailhead parking and a limited, primitive trail system of about two miles in length to the Little Black Peak cinder cone and to the Lower Windmill area. Develop three miles of trail to Malpais Madness Cave. Acquire legal access prior to development.	Same as Alternative D
Visual Resources	Require painting of all permanent surface facilities or equipment. Color of "Carlsbad Canyon" would normally be used.	Require painting of all permanent surface facilities or equipment. Paint colors would be selected to blend with surrounding landscape.	Require painting of all permanent surface facilities or equipment in Class II VRM zones. Painting would also be required in some Class III areas. Color of "Carlsbad Canyon" would normally be used.	Same as Alternative C, except that colors would be selected to blend with surrounding landscape.	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WATERSHED	Brush treatments would be conducted to increase soil moisture for plant growth and to prevent surface soil erosion. Projects would include: mechanical control, chemical control, and prescribed burns.	Refer to Vegetation	Refer to Vegetation	Refer to Vegetation	Refer to Vegetation
	During periods of drought adjustments in livestock numbers would be made.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Allow new roads or trails to be constructed only if existing roads and trails cannot be used.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Soil Management	No similar action	Allow no occupancy or use on slopes over 10%. Allow occupancy or use on fragile soils on case by case basis.	Allow no occupancy or use on slopes over 30% except with BLM approved plan of operations and development. Allow occupancy or use on fragile soils on case by case basis.	No occupancy or use on slopes over 20%. Allow occupancy or use on fragile soils on case by case basis.	Same as Alternative D
Surface Water Management: Quantity	Continue to implement watershed enhancement projects for streambank stabilization, headcutting and erosion prevention, and revegetation.	Develop and implement strategic watershed management plans for watersheds that are susceptible to severe long-term soil losses.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WATERSHED (continued) Surface Water Management: Quality	No similar action	Prevent degradation of water quality whenever practicable, even when deemed "justifiable as a result of necessary economic and social development" under the WQCC Antidegradation Policy.	Prevent degradation of water quality whenever practicable. Water quality standards more stringent than state and federal standards would not be imposed if an increased economic cost would be incurred.	Prevent degradation of water quality whenever practicable. Exceptions would be made on a case-by-case basis when water quality standards more stringent than state and federal standards would result in increased economic costs that exceed environmental benefits.	Same as Alternative D
	No similar action	Specify Best Management Practices in activity plans for actions that degrade surface water quality. Primary emphasis of BMPs would be on preserving environmental values.	Specify Best Management Practices on a case-by-case basis for actions that degrade surface water quality. Strong emphasis would be placed on the economic impact.	Specify Best Management Practices on a case-by-case basis for actions that degrade surface water quality. Full consideration would be given to the environmental benefits and economic costs of the BMPs.	Same as Alternative B
	No similar action	Initiate cooperative agreements, MOUs, or other interagency efforts to manage entire watersheds.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Continue to move oil and gas drilling locations up to 200 meters from floodplains as necessary.	Allow No Surface Occupancy within up to 400 meters of the outer edge of 100-year floodplains.	Allow occupancy and use in floodplains based on a BLM approved plan of operation.	Allow No Surface Occupancy within floodplains and within up to 200 meters of the outer edge of 100-year floodplains.	Same as Alternative D
	Continue to move oil and gas drilling locations up to 200 meters from playas/alkali lakes as necessary.	Allow No Surface Occupancy within up to 400 meters of playas/alkali lakes.	Allow No Surface Occupancy within playas/alkali lakes.	Allow No Surface Occupancy within up to 200 meters of playas/alkali lakes. Exceptions considered with mitigation.	Same as Alternative D

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WATERSHED (continued) Surface Water Management: Quality (continued)	Continue to move proposed oil and gas drilling locations up to 200 meters from springs and seeps as necessary.	Allow No Surface Occupancy within up to 400 meters of springs/seeps or within up to 200 meters of downstream riparian areas. Allow No Surface Occupancy within up to 400 meters of earthen tanks or riparian areas created by tanks.	Allow No Surface Occupancy within up to 200 meters of springs/seeps or within downstream riparian areas. Allow No Surface Occupancy within up to 200 meters of earthen tanks or riparian areas created by tanks.	Allow No Surface Occupancy within up to 200 meters of springs/seeps or within up to 200 meters of downstream riparian areas. Allow No Surface Occupancy within up to 200 meters of earthen tanks or riparian areas created by tanks.	Same as Alternative C
Ground Water Management		Prevent degradation of ground-water quality whenever practicable, even when WQCC standards allow for further degradation.	Prevent degradation of ground-water quality whenever practicable, even when WQCC standards allow for further degradation. Exceptions would be made when standards more stringent than state and federal standards would result in increased economic costs being incurred.	Prevent degradation of ground-water quality whenever practicable, even when WQCC standards allow for further degradation. Exceptions would be made on a case-by-case basis when standards more stringent than state and federal standards would result in increased economic costs which exceed environmental benefits.	Same as Alternative D
	No similar action	Specify Best Management Practices for actions that degrade ground-water quality. Primary emphasis of BMPs would be on preserving environmental values.	Specify Best Management Practices on a case-by-case basis for actions that degrade ground-water quality. Strong emphasis would be placed on the economic impact.	Specify Best Management Practices on a case-by-case basis for actions that degrade ground-water quality. Full consideration would be given to environmental benefits and economic impact.	Same as Alternative B
WILDLIFE HABITAT MANAGEMENT	No similar action	Acquire lands and interests within Wildlife Habitat Area's to enhance wildlife habitat management.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WILDLIFE HABITAT MANAGEMENT (continued)	Continue to move oil & gas drilling locations up to 200 meters as necessary to protect wildlife projects.	Allow No Surface Occupancy within up to 400 meters of existing or planned wildlife improvement projects.	Allow No Surface Occupancy within up to 200 meters of existing or planned wildlife improvement projects.	Same as Alternative C	Same as Alternative C
Special Status species Habitat Management	No similar action	Allow No Surface Occupancy in suitable Dune Sagebrush Lizard Habitat.	Allow No Surface Occupancy in specific areas where Dune Sagebrush Lizard occurrences have been documented. Consider relocation of proposal of up to 200 meters to avoid these areas.	Allow No Surface Occupancy in occupied Dune Sagebrush Lizard habitat, or in suitable isolated dunes or contiguous dune complexes.	Allow No Surface Occupancy in occupied Dune Sagebrush Lizard habitat.
Big Game/Upland Game Habitat Management	No similar action	Conduct big game and upland game transplants or reintroductions.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Improve mule deer habitat through wildlife habitat developments and other management practices such as construction of wildlife and livestock waters, prescribed fires, fuelwood sales, fence modifications and exclosures, aerial surveys, exclusion and buffer zones within brush control projects, and grazing system modifications.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
Big Game/Upland Game Habitat Management (continued)	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken habitat between April 1 and May 31 during the morning hours.	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken habitat between March 1 and June 30 during the morning hours. No new drilling allowed within up to 200 meters of leks.	Same as Alternative A	Allow no geophysical, oil & gas drilling, or other development in Lesser prairie chicken core habitat between March 1 and May 31 during the morning hours. No new drilling allowed within up to 200 meters of leks.	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WILDLIFE HABITAT MANAGEMENT (continued)	No similar action	Exclude major rights-of-way from core prairie chicken habitat areas. Avoid rights-of-way in Caprock WHA outside core habitat areas.	Avoid major rights-of-way in core prairie chicken habitat areas.	Same as Alternative C	Same as Alternative C
Waterfowl Habitat Management	No similar action	Develop as many as 400 acres of wetland habitat within the Pecos River floodplain.	Develop as many as 400 acres of wetland habitat within the Pecos River floodplain where development would not conflict with oil and gas production.	Same as Alternative B	Same as Alternative B
	No similar action	Use agricultural practices and moist soil management techniques to enhance yearlong food supplies for wildlife on the Rio Bonito acquired lands.	Use agricultural practices to provide forage for livestock and habitat for wildlife habitat on the Rio Bonito acquired lands.	Same as Alternative B	Same as Alternative B, except add livestock grazing as a vegetation management tool.
Raptor Habitat Management	Continue to move oil & gas drilling locations up to 200 meters as necessary to protect heronries or raptor nests.	Allow No Surface Occupancy within up to 400 meters of active haronries. Allow No Surface Occupancy within up to 400 meters of raptor nests on natural habitat features and/or delay activity for up to 90 days.	Allow No Surface Occupancy within up to 200 meters of active heronries. Allow No Surface Occupancy within up to 200 meters of raptor nests on natural habitat features and/or delay activity for up to 60 days.	Same as Alternative C	Allow No Surface Occupancy within up to 200 meters of active heronries. Allow No Surface Occupancy within up to 200 meters of raptor nests on natural habitat features and/or delay activity for up to 90 days.

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
WILDLIFE HABITAT MANAGEMENT (continued) Fisheries Habitat Management	Use streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection on the Rio Bonito, Salado Creek and the Pecos River.	Same as Alternative A	Use streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection on the Rio Bonito, Salado Creek and the Pecos River where there would be no conflict with mineral development and production.	Same as Alternative A	Same as Alternative A
	No similar action	Introduce or transplant native fish and sport fish in suitable waters on public land.	Same as Alternative B	Same as Alternative B	Same as Alternative B
Riparian/Wetland and Playa Lake Management	Use fire, mechanical or chemical means to control salt cedar on up to 3,000 acres in selected riparian-wetland areas.	Allow salt cedar control for the Rio bonito, Salado Creek, and Pecos River. See Vegetation for restrictions.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Enhance springs, reservoirs, earthen tanks and playa lakes by constructing exclosures, establishing vegetation for wildlife cover and providing off-site livestock water.	Enhance springs and seeps, reservoirs, earthen tanks and playa lakes by constructing exclosures, establishing vegetation for wildlife cover, planting native vegetation, providing off-site livestock water, controlling undesirable vegetation and constructing water pipelines.	Same as Alternative B	Same as Alternative B	Same as Alternative B
FIRE MANAGEMENT Prescribed Fire	On an annual basis, conduct four management ignited prescribed fires totalling 2,000 to 5,000 acres.	Conduct management ignited prescribed fires when fire would heop acheive the Desired Plant Community.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
FIRE MANAGEMENT (continued) Protection from Wildfire	Protect man-made facilities or important natural resource values through full suppression of wildfire . Apply the conditional fire suppression response level to the remainder of the resource area.	Apply the conditional fire suppression response level resource area-wide, except in specific instances to protect man-made facilities or important natural resource values.	Same as Alternative B	Same as Alternative B	Same as Alternative B
OVERFLOW ACEC	No similar action	Consider developments of access, parking areas and fence crossings for public fishing on the Pecos River.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Continue recreation development in accordance with the Habitat Management Plan.	Consider development of nature trails, overlooks, restroom facilities, picnic tables, trash containers, parking areas, bulletin boards, and access roads.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action	Designate about 700 acres as "Closed" and about 2,300 acres "Limited" to designated roads and trails for OHVs.	Designate about 700 acres "Limited" to designated roads and trails and 2,300 acres "limited" to existing roads and trails for OHV use.	Same as Alternative B	Designate about 1,040 acres as "closed" and about 2,100 acres "limited" to designated roads and trails for OHV use.
	No similar action	Acquire easements to resolve conflicts and enhance management.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Acquire about 963 acres to increase wetlands and provide buffer.	Acquire about 1,700 acres of state and 2,100 acres of private lands with riparian values as opportunities arise.	Acquire about 960 acres of private land as opportunities arise.	Same as Alternative B	Same as Alternative B
	No similar action	Develop about 300 acres of additional riparian/wetland habitat	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
OVERFLOW ACEC (continued)	No similar action	Control salt cedar in riparian/wetland areas using prescribed fire or mechanical control.	Control salt cedar in riparian/wetland areas using prescribed fire, mechanical control, or chemical control.	Control salt cedar in riparian/wetland areas using prescribed fire, mechanical control or by hand application of chemicals.	Same as Alternative C
	No similar action	Adjust grazing leases to improve habitat on about 3,000 acres. May include changes in stocking rate and seasons of use such as from March 1 to June 30. Retire grazing lease on Allotment 65041.	Adjust grazing leases to improve habitat on about 3,000 acres. May include changes in stocking rate and seasons of use such as from March 1 to September 30. Retire grazing lease on Allotment 65041.	Adjust grazing leases to improve habitat on about 3,000 acres. May include changes in stocking rate and seasons of use such as from March 1 to mid-August. Retire grazing lease on Allotment 65041.	Same as Alternative B
	Allow oil and gas leasing with No Surface Occupancy on about 870 acres in the Wildlife Habitat Area.	Close about 700 acres to oil and gas leasing. Allow leasing with No Surface Occupancy on about 2,300 acres.	Allow oil and gas leasing with No Surface Occupancy on about 1,040 acres.	Same as Alternative B	Same as Alternative C
	No similar action	Close about 3,000 acres to mineral material disposal and solid mineral leasing. Withdraw 3,000 acres from locatable mineral entry.	Close about 700 acres to mineral material disposal and solid mineral leasing. Withdraw 700 acres from locatable mineral entry.	Same as Alternative B	Close about 1,040 acres to mineral material disposal and solid mineral leasing. Withdraw 1,040 acres from locatable mineral entry.
	No similar action	Exclude major right-of-way on about 3,000 acres.	Exclude major rights-of-way on about 700 acres and avoid 2,300 acres for major rights-of-way.	Same as Alternative B	Same as Alternative B
NORTH PECOS RIVER ACEC	No similar action	Designate about 3,360 acres as "closed" to OHV use.	Designate about 3,360 acres as "limited" to designated roads and trails for OHV use.	Same as Alternative C	Same as Alternative C
	No similar action	Acquire access easements to resolve conflicts and enhance management.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
NORTH PECOS RIVER ACEC (continued)	No similar action	Acquire about 1,160 acres of state and 1,880 acres of private land as opportunities arise.	No similar action	Same as Alternative B	Same as Alternative B
	No similar action	Exclude major rights-of-way from all ACEC lands and those lands acquired for special status species and riparian/wetland habitat.	Avoid major rights-of-way in the entire ACEC.	Same as Alternative B	Same as Alternative C
	No similar action	Close about 4,200 acres to mineral material disposal and solid mineral leasing. Withdraw about 4,200 acres from locatable mineral entry.	Close about 1,520 acres to mineral material disposal. Close about 4,200 acres from solid mineral leasing. Withdraw about 4,200 acres from locatable mineral entry.	Close about 1,760 acres to mineral material disposal. Close about 4,200 acres from solid mineral leasing. Withdraw about 4,200 acres from locatable mineral entry.	Same as Alternative B
	Allow no oil and gas surface disturbing activities within floodplain wetland and riparian habitat areas. Allow activities in non-riparian and non-wetland areas in floodplains on a case-by-case basis. Restrict all vehicle use to designated or authorized access routes.	Close about 2,080 acres to oil and gas leasing. Allow leasing with No Surface Occupancy on about 2,120 acres.	Allow oil and gas leasing with No Surface Occupancy on about 4,200 acres.	Same as Alternative B	Same as Alternative B
	No similar action	Conduct salt cedar control on about 600 acres using prescribed fire or mechanical control.	Conduct salt cedar control on about 600 acres using prescribed fire, mechanical or chemical control.	Conduct salt cedar control on about 600 acres using prescribed fire, mechanical or hand application of chemicals.	Same as Alternative C
	No similar action	Adjust grazing use on about 3,360 acres. May include changes in season of use and stocking rates.	No similar action	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
MESCALERO SANDS ACEC	"Close" 1,838 acres in the ONA to OHV use. Retain the "limited" to existing roads and trails designation on about 4,334 acres in the ONA.	Close the entire ACEC to OHV use.	Designate the entire ACEC as "limited" to designated roads and trails for OHV use.	Same as Alternative C	Close 2,478 acres to OHV use. Designate 5,410 acres as "limited" to designated roads and trails for OHV use.
	Retain the withdrawal of 6,617 acres from locatable mineral entry.	Withdraw the entire ACEC from locatable mineral entry.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Allow oil and gas leasing with No surface Occupancy on about 2,934 acres in the ONA.	Close the entire ACEC to oil and gas leasing.	Allow oil and gas leasing with No Surface Occupancy.	Same as Alternative C	Same as Alternative B
	No similar action	Close the ACEC to solid mineral leasing and mineral material disposal.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Continue to exclude livestock grazing on about 1,838 acres.	Close the entire ACEC to livestock grazing.	Continue to exclude livestock grazing on about 1,838 acres. Allow no increase in grazing preference. Allow no new range improvements or vegetation treatments.	Exclude grazing on 2,478 acres. On other areas in ACEC, allow no increase in grazing preference. Allow no new range improvements or vegetation treatments.	Same as Alternative D
	No similar action	Acquire up to 1,800 acres of state and 320 acres of private land if opportunities arise.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action	Acquire easements to resolve conflicts and enhance management.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action	Exclude major rights-of-way in the ACEC.	Avoid major rights-of-way in the ACEC.	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
MESCALERO SANDS ACEC (continued)	Retain the National Natural Landmark designation on 3,208 acres and the Outstanding Natural Area designation on 6,173 acres.	Same as Alternative A	No similar action	Same as Alternative A	Same as Alternative A
FT. STANTON ACEC	No similar action	Exclude major rights-of-way on about 24,630 acres.	Avoid major rights-of-way on about 24,630 acres.	Same as Alternative B	Same as Alternative B
	Pursue acquisition of the New Mexico State University facilities at Ft. Stanton.	Pursue acquisition of the New Mexico State University facilities at Ft. Stanton. Develop a BLM administrative site.	Same as Alternative B	Same as Alternative B	Same as Alternative A
	Fort Stanton (27,622 acres) would remain closed to the disposal of mineral materials and oil and gas and solid mineral leasing, and withdrawn from locatable mineral entry.	Close 25,951 acres within Fort Stanton to mineral material disposal. Close 27,622 acres to oil and gas and solid mineral leasing. Withdraw the area from locatable mineral entry.	Open Ft. Stanton to mineral material disposal. Close 27,622 acres to oil and gas and solid mineral leasing. Withdraw the area from locatable mineral entry.	Same as Alternative C	Same as Alternative C
	Allow livestock grazing on a 9-month basis. Exclude grazing in riparian exclosures and the Rio Bonito Campground.	Exclude livestock grazing. Convert water developments for wildlife. Consider removal of other improvements.	Allow livestock grazing with a season of 9 or more months. Establish no grazing preference.	Limit or exclude livestock grazing in riparian pastures, highly erodible areas, cave entrances, campgrounds, day use areas, and sensitive archaeological sites. Establish no grazing preference.	Allow livestock grazing to the extent it could be used as a tool to accomplish resource objectives. Establish no grazing preference.
	Manage the Feather Cave National Register site for off-site interpretation.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
FT. STANTON ACEC (continued)	Maintain and upgrade existing recreation facilities. Develop cultural/natural interpretive opportunities.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action	Limit vehicle camping to Rio Bonito and Ft. Stanton Cave campgrounds and designated campsites. Allow no camping within 100 feet of creeks or within 300 feet of wildlife waters, seeps and springs and paved highways. Allow no camping within ¼ mile of waysides, overlooks, interpretive trails or state highways unless otherwise designated.	Limit vehicle camping to Rio Bonito and Ft. Stanton Cave campgrounds and designated campsites. Allow no camping within 100 feet of creeks or within 300 feet of wildlife waters, seeps and springs and paved highways. Allow no camping within ¼ mile of waysides, overlooks, interpretive trails or state highways unless otherwise designated. Establish a walk-in primitive campground along the Rio Bonito.	Same as Alternative C	Same as Alternative B
	No similar action.	Acquire up to 1480 acres adjacent to Ft. Stanton as opportunities arise.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Close Ft. Stanton cave from November 1 to April 15 annually.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Retain "limited" to designated roads and trails designation on 14,800 acres for OHV use. Remainder of area to be "open" to OHV use.	Designate Ft. Stanton as "limited" to designated roads and trails for OHV use, except: close 100-foot wide corridor along Rio Bonito and Salado Creek, and all multi-use trails to OHV use.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
FT. STANTON ACEC (continued)	Maintain and upgrade the Petroglyph National Recreation Trail and approximately 20 miles of existing horse trails, 18 miles of mountain bike trail, and 2 miles of hiking trail.	Develop and maintain up to 80 miles of trails for hiking, horseback riding, and mountain bikes.	Develop and maintain up to 115 miles of trails for hiking, horseback riding, and mountain bikes.	Develop and maintain up to 105 miles of trails for hiking, horseback riding, and mountain bikes.	Same as Alternative D
	No similar action	Conduct big game, upland game, native fish and sport fish transplants and reintroduction in cooperation with NM Department of Game and Fish.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Allow firewood sales and conduct prescribed burns in piñon-juniper community types.	Allow firewood sales and prescribed burns in selected community types.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action	Conduct salt cedar control on up to 300 acres using prescribed fire or mechanical control.	Conduct salt cedar control on up to 300 acres using prescribed fire, mechanical control or chemical.	Conduct salt cedar control on up to 300 acres using prescribed fire, mechanical control or by application of chemicals by hand.	Same as Alternative C
	No similar action	Apply wildfire suppression to protect T&E species habitat, Ft. Stanton Cave entrance, Rio Bonito Campground and buffer area. Allow no bulldozers to construct fire line.	Same as Alternative B	Same as Alternative B	Same as Alternative B
CAVE ACEC	Allow oil and gas leasing, with No Surface Occupancy on 180 acres, and No Leasing on 40 acres.	Close the ACEC to oil and gas and solid mineral leasing, and to mineral material disposal. Withdraw the ACEC from locatable mineral entry.	Allow oil and gas leasing with No Surface Occupancy.	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CAVE ACEC (continued)	Retain the 40 acre withdrawal from locatable mineral entry for the Torgac NNL.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action	Exclude major rights-of-way within entire ACEC.	Avoid major rights-of-way within entire ACEC.	Same as Alternative B	Same as Alternative B
	No similar action	Construct exclosures around cave entrances to control access or reduce cave impacts. Exclude livestock grazing within exclosures.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Continue to manage Torgac, Agogino and Crockett caves in accordance with cave management plans. Permits and use restrictions are required. Maintain and upgrade existing trails and gates.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action.	Close Bat Hole Cave and Coachwhip Cave to all visitor use except for administrative and research purposes.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	Close five ACEC caves to visitor use annually from November 1 to April 15. Apply season of use and visitor use restrictions to caves with significant bat populations.	Same as Alternative A	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No similar action	Retain all public land in ACEC. Acquire about 4,920 acres of private land if opportunities arise.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 2 (continued)

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
CAVE ACEC (continued)	No similar action	Prescribe visitation limits and special stipulations through cave management plans.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action	Acquire access easements to Crockett, Millrace, and Crystal Caverns - Devils Well caves.	Same as Alternative B	Same as Alternative B	Same as Alternative B
	No similar action	Designate up to 500 acres as "closed" to OHV use (excluding WSA's). Designate remaining lands as "limited" to designated roads and trails for OHV use.	Same as Alternative B	Same as Alternative B	Same as Alternative B

TABLE 3
SUMMARY OF IMPACTS
(TO OIL AND GAS RESOURCES)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Lands not Open to Leasing	449,809 acres would remain closed to leasing. Impacts associated with closing lands to oil and gas leasing in these areas would continue to make oil and gas development unavailable in these areas. Lands subject to closure could also be subject to drainage from wells outside the closed lands, and the Federal Government could lose royalties. The long-term effects of oil and gas closures would include lost production opportunities, lost royalties and lost job opportunities. Continuing to keep these lands closed, could represent up to 35 wells in the RRA and up to 106 wells in the CRA that would not be drilled during the twenty year planning period.	Same as Alternative A, except 529,668 acres would be closed to leasing. This represents an additional 79,859 acres from Alternative A, that would be closed to leasing. This increase in acres closed to leasing could represent a loss in bonus bids of up to $3,673,514. This increase in acreage from Alternative A, could represent up to 6 additional wells in the RRA and up to 45 additional wells in the CRA that may not be drilled during the twenty year planning period.	Same as Alternative A, except 454,106 acres would be closed to leasing. This represents an additional 4,297 acres from Alternative A, that would be closed to leasing. This increase in acres closed to leasing could represent a loss in bonus bids of up to $197,662. This increase in acres proposed to be closed from Alternative A, could represent up to 2 additional well in the RRA and 3 additional wells in the CRA, that may not be drilled during the twenty year planning period.	Same as Alternative A, except 485,015 acres would remain be closed to leasing. This represents an additional 35,206 acres that would be closed to leasing. This increase in acres closed to leasing could represent a loss in bonus bids of up to $1,619,476. This increase in lands proposed to be closed from Alternative A could represent up to 4 additional wells in the RRA and 19 additional wells in the CRA that may not be drilled during the 20 year planning period.	Same as Alternative A, except 503,766 acres would remain be closed to leasing. This represents an additional 53,957 acres that would be closed to leasing. This increase in acres closed to leasing could represent a loss in bonus bids of up to $2,482,022. This increase from Alternative A in acres proposed to be closed, could represent up to 6 additional wells in the RRA and 21 additional wells in the CRA that may not be drilled during the twenty year planning period.

TABLE 3 (continued)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Lands with No Surface Occupancy (NSO)	118,142 acres would continue to have the No Surface Occupancy stipulation attached. This could represent up to 120 wells in the planning area that may be negatively impacted over the next twenty years under these circumstances. Impacts associated with leasing with the NSO Stipulation attached would cause proponents of new development to relocate drilling projects, resulting in increased construction costs of each project, and in some instances making oil and gas development impossible and/or cost-prohibitive. Some lands may have to be developed through directional well drilling.	Same as Alternative A, except 84,281 acres would have the No Surface Occupancy stipulation attached. This represents a decrease of 33,861 acres from the 118,142 acres that currently have the No Surface Occupancy stipulation attached. These acres could represent up to 79 wells in the planning area that could be negatively impacted during the twenty year planning period.	Same as Alternative A, except 121,903 acres would have the No Surface Occupancy stipulation attached. This represents an increase of 3,761 acres from the 118,142 acres that currently have the No Surface Occupancy stipulation attached. These acres could represent up to 87 wells in the planning area that could be negatively impacted during the twenty year planning period.	Same as Alternative A, except 120,272 acres would have the No Surface Occupancy stipulation attached. This represents an increase of 2,130 acres from the 118,142 acres that currently have the No Surface Occupancy stipulation attached. This change in acres, could represent up to 107 wells in the planning area that could be negatively impacted during the twenty year planning period.	Same as Alternative A, except 110,060 acres would have the No Surface Occupancy stipulation attached. This represents a decrease of 8,082 acres from the 118,142 acres that currently have the No Surface Occupancy stipulation attached. This change in acres, could represent up to 103 wells in the planning area that could be negatively impacted during the twenty year planning period.
Lands with Controlled Surface Use (CSU)	132,027 acres would continue to have the CSU stipulation attached. Impacts to oil and gas activities could result in the need for more long-range planning of oil and gas activities, mitigation of resource impacts, the requirement to use more expensive construction methods, and the need to meet minimum performance requirements and standards.	Same as Alternative A, except 57,240 acres would have the CSU stipulation attached. This represents a decrease of 74,787 acres from the current 132,027 that currently have the CSU stipulation attached.	Same as Alternative B.	Same as Alternative B.	Same as Alternative B.

TABLE 3
SUMMARY OF IMPACTS
(TO LANDS AND REALTY RESOURCES)

The greatest impacts to rights-of-way are due to avoidance and exclusion areas. Avoidance areas designate where siting and construction would be difficult, and detailed analysis would be required to develop stipulations. Exclusion areas designate where siting would be virtually impossible, only a thorough review and EIS analysis could justify locations in these areas, and significant stipulations would be necessary.

Land ownership adjustments (e.g., increases and/or decreases in BLM-administered lands) would block up BLM administered lands, and isolated BLM tracts would be available for disposal. Various methods of land ownership adjustment would be considered and accomplished. Emphasis would be given to those adjustments that would provide the most benefits to the public. The preferred method of disposal would be exchange, since the exchange method tends to balance the impacts of disposal with those of acquisition.

		ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Utility and Transportation System	Exclusion Areas	Increased costs would occur as a result of reroutes, increased distance and delays on 37,156 acres.	Same as Alternative A, except the acreage excluded would increase to 335,573.	Same as Alternative A, except the acreage excluded would decrease to 30,903.	Same as Alternative A, except the acreage excluded would increase to 90,375.	Same as Alternative A, except acreage excluded would increase to 90,895.
	Avoidance Areas	No avoidance areas designated; therefore, no negative impacts would occur.	Increased costs would occur as a result of reroutes, increased distance and delays on 310,833 acres.	Same as Alternative B, except the acreage avoided would decrease to 306,219.	Same as Alternative B, except the acreage avoided would decrease to 246,987.	Same as Alternative B, except the acreage avoided would decrease to 249,463.
Land Ownership Adjustments	Acquisitions	The acquisition of 960 acres within the Overflow Wetlands WHA and up to 2,000 acres of non-federal land along the Rio Bonito could occur.	The acquisition of 95,579 acres of non-federal and up to 3,000 acres of non-federal land along the Rio Bonito could occur.	Same as Alternative B except the acquisition of 56,056 acres of non-federal land and up to 3,000 acres along the Rio Bonito could occur.	Same as Alternative B.	Same as Alternative B except the acquisition of 92,926 acres of non-federal land and up to 3,000 acres could occur.
	Easements	No similar action.	Accessibility to and across public lands would improve.	Similar to Alternative B.	Similar to Alternative B.	Similar to Alternative B.

TABLE 3
SUMMARY OF IMPACTS
(TO LIVESTOCK MANAGEMENT)

Impacts to livestock across the resource area are due to various factors, such as reduction in available forage, change in class of livestock, change in turnout dates, implementation of ACEC management, change in utilization levels and elimination of grazing. Across the resource area the change in Animal Unit Months (AUMs) may be considered insignificant. However, as most of the proposals may affect a small number of allotments, the change may become significant on a site-specific basis. Variations in the change of AUMs is due to the range of acreage to be excluded from grazing or changes in allowable forage utilization levels.

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Livestock Management	Approximately 720 Animal Unit Months (AUMs) would be eliminated due to disposal of about 3,155 acres of public land presently classified for disposal. Current permitted preference would remain at 329,730 AUMs, unless decreases occur as a result of vegetation monitoring studies.	All proposed actions would cause a net decrease of up to 81,336 AUMs in the resource area, including 5,316 AUMs located at Ft. Stanton. The total active permitted use in the resource area would be 253,710 AUMs, a decrease of 23 percent.	All proposed actions would cause a possible decrease of 36,648 AUMs, however increasing allowable forage utilization levels would yield an overall increase of 1,404 AUMs. The resource area permit level would be 331,134 AUMs.	All proposed actions would cause a decrease of 37,548 AUMs, including 72 AUMs at Ft. Stanton. The resource area would then have a total grazing preference of 292,254 AUMs, a decrease of about 11 percent.	Same as Alternative D

TABLE 3
SUMMARY OF IMPACTS
(TO VEGETATION RESOURCES)

The most significant impacts to vegetation are surface disturbing activities, grazing and chemical treatments. Surface disturbing activities result in removed or impaired vegetation. Grazing utilization results in partial removal of vegetative material. Chemical controls result in changing the composition of vegetative communities.

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Surface Disturbance	Vegetation would be impaired or removed from surface disturbing activities such as oil and gas development, OHV use, mineral material extraction, etc.	Same as Alternative A, but the least vegetation of all alternatives would be affected because of increased land use restrictions.	Same as Alternative A, but the most vegetation of all alternatives would be affected because of the emphasis on development.	Same as Alternative A, but with more vegetation being affected than Alternative B but less acres than Alternative C.	Same as Alternative B, with the exception that greater amounts of vegetation may be affected because OHV use would be "limited" to designated roads and trails instead of "closed".
Grazing	Vegetation utilization would be maintained at present levels (45% utilization).	Vegetation utilization decreases (40% utilization) would result in more residual vegetation and enhanced watershed values.	Vegetation utilization increases (50% utilization) would result in less residual vegetation but greater forage supplies.	Same level of utilization as Alternative A.	Same level of utilization as Alternative A.
Chemical Controls	The composition of vegetative communities on up to about 225,000 acres would be changed to meet livestock, wildlife and watershed goals.	The composition of vegetative communities would be changed slowly to meet wildlife and to a lesser degree livestock goals.	The composition of vegetative communities would be changed (primarily shrub reduction) to meet livestock and to a lesser degree wildlife goals. The composition of greater amounts of acreage would be potentially changed than under all other alternatives (with the possible exception of Alternative A).	Same as Alternative B, except greater potential for salt cedar reduction.	Similar to Alternative C, except with greater emphasis on wildlife and watershed goals and greater potential for diversity on a landscape basis (longer waiting periods for treatment of adjacent areas).

TABLE 3
SUMMARY OF IMPACTS
(TO CULTURAL RESOURCES)

The most significant negative cumulative impacts to cultural resources in the Roswell District are illegal artifact collecting and loss of site integrity due to soil erosion. Project construction increases public access which in turn increases the opportunity for artifact collecting. Soil erosion resulting from project construction displaces cultural materials. By designating important archeological areas as special management areas, cultural resources can be better protected from negative impacts by restricting surface use. Two proposed archeological districts, Haystack Butte and Cocklebur Lakes would gain additional protection from surface disturbance by limiting land use. This is also true for the Garnsey Bison Kill Site and the alleged UFO crash site(s). Cultural inventory surveys would be required prior to most surface disturbing activities.

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Illegal Artifact Collecting	Class 3 pedestrian inventory would precede most surface disturbing activities. This would result in cultural sites either being avoided or studied, but the surface disturbing activity could increase public access which could result in illegal artifact collecting.	Same as Alternative A but the least acres of all alternatives would be disturbed because of increased land use restrictions.	Same as Alternative A.	Same as Alternative A but with more acres being affected than Alternative B but less acres than Alternatives A and C.	Same as Alternative B with the exception that increased public access (and illegal artifact collecting) may result from OHV use being "limited" to designated roads and trails instead of "closed".
Soil Erosion	Soil erosion resulting from surface disturbing activities could impair integrity of cultural sites.	Same as Alternative A but the least acres of all alternatives would be affected because of increased land use restrictions.	Same as Alternative A.	Same as Alternative A but with more acres being affected than Alternative B but less acres than Alternatives A and C.	Same as Alternative B with the exception that additional erosion may result from OHV use being "limited" to designated roads and trails instead of "closed".
Special Management Areas-Cultural	No similar action.	Provides the most protection of cultural sites of all the alternatives by restricting surface disturbing activities the most.	Provides the least protection of all the alternatives by restricting surface disturbing activities the least.	Provides more protection than Alternative C but less protection than Alternative B.	The same level of impacts as Alternative B except for the impacts that may result from the designation of 3,400 acres at Haystack Butte and 3,000 acres at Cocklebur Lakes as "limited" to designated roads and trails for OHV use instead of "closed".

TABLE 3
SUMMARY OF IMPACTS
(TO RECREATION RESOURCES)

This summary discusses those impacts to recreation, visual and cave resources from various impacts or other BLM programs. While caves are a natural resource, the heavy interest in cave exploration as a recreational pursuit has traditionally placed caves in the recreation program. The focus of this summary is primarily resource area-wide, although in some cases specific sites or sub-areas are discussed. The focus is on activities or program aspects that have the most significant positive or negative impacts on recreation, visual and cave resources.

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Oil and Gas Development Mineral Development	Recreational areas, visual resources and cave/karst resources would be impacted by surface and subsurface disturbance stemming from oil and gas and mineral development. Impacts include impaired viewsheds from well pads, mineral material pits, pipelines and roads. There is potential for irreversible and irretrievable impacts to cave resources from drilling and excavation activities.	Impacts to recreational areas and opportunities, visual resources and cave/karst features would be minimized from surface and subsurface disturbing activities through a combination of surface use and occupancy stipulations and closed/withdrawn areas.	The magnitude of impacts under alternative C would be similar to those of Alternative A.	The magnitude of impacts under Alternative D would be similar to Alternative C, with the exception of fewer potential adverse impacts to visual resources.	The magnitude of impacts under Alternative E would be similar to Alternative D.
Lands and Realty Management	Retained exclusion zones would protect existing recreational areas designated as Wilderness Study Areas, National Natural Landmarks and Outstanding Natural Areas. Negative impacts from surface and subsurface disturbing activities would continue to occur on cave/karst resources and visual resources. Acquisitions would improve recreational potential in the Rio Bonito Valley and Wilderness Study Areas.	Recreational sites and significant cave/karst areas would be protected from surface and subsurface disturbance activities through a combination of surface use and occupancy stipulations and avoidance/exclusion areas resulting in long-term benefits to important special management areas, recreational opportunities and visual resources. Acquisitions would improve recreational potential throughout the Resource Area.	Recreational and cave/karst resources would be less protected with an emphasis on avoidance area designation. Surface use and occupancy stipulations would reduce the area protected around cave resources. Recreational opportunities through acquisition would be greater than Alternative A but less than Alternatives D and E.	More emphasis would be placed on exclusion areas than Alternative C resulting in long-term protection of important special management areas. Impacts from the surface use and occupancy stipulations to protect cave/karst resources would be the same as Alternative C. Recreational opportunities through acquisition are the same as Alternative B.	Same as Alternative D.

TABLE 3 (continued)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Livestock Management	Recreational opportunities would continue to be impaired by livestock grazing at recreational sites unprotected by fences. Visual resources would be impacted through the presence of range improvements and the altering of natural vegetation, particularly in riparian areas.	Changes in livestock use to reduce conflicts with recreation areas and larger areas excluded from grazing would have positive impacts to recreation and visual resources.	Changes in livestock use to reduce conflicts with recreation areas and limited areas excluded from grazing would have some positive impacts to recreation and visual resources.	Same as Alternative C with slightly larger areas excluded from grazing.	Same as Alternative D.
Recreation Management	Recreational developments would be limited to a few recreational sites resulting in limited recreational opportunities and interpretive potential.	An emphasis on semi-primitive recreation at special management areas would limit developments and offer positive benefits to recreationists who prefer primitive recreational opportunities. Greater emphasis on interpretative would be featured.	Long-term benefits would be derived from an expanded, intensive recreational program aimed at providing a variety of recreational and interpretive opportunities throughout entire the Resource Area.	Same as Alternative B.	Same as Alternative B, except low-impact developments would be established in special management areas.

TABLE 3
SUMMARY OF IMPACTS
(TO WATERSHED RESOURCES)

The most significant watershed impacts in the Roswell District are the result of accelerated soil erosion. High erosion rates lead to decreases in infiltration, resulting in less available soil moisture, less ground-water recharge, and lost site productivity. It also leads to impaired aquatic and riparian habitat, impaired water quality, increased surface runoff, flood hazards, and sedimentation rates, and decreased lifespan of sediment control structures. Two key methods are used to minimize erosion: (1) controlling the amounts and types of surface disturbances (e.g. recreation site development and use, OHV use, water developments, and fire management); and (2) maintaining vegetative cover (e.g. riparian management, water developments, and vegetation management).

Note that the summary table does not include all impacts, but only those which vary significantly among the Alternatives. For example, soil losses due to oil and gas activity in the Carlsbad Resource Area may produce significant impact, but because all Alternatives are based on past demand for oil and gas, estimates of the magnitude of soil loss does not vary among Alternatives.

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
OHV Use	Uncontrolled use associated with open designation would lead to greatest watershed degradation.	Impacts would be reduced by limiting OHV use to designated roads and trails. Almost all water sources would be protected by prohibiting OHV use within 400 meters of water sources. Some watershed degradation would still occur because of illegal use and route proliferation.	Impacts would be reduced by limiting OHV use to designated roads and trails. Impacts to water sources could be severe because no buffer is provided.	Same as Alternative B, except that OHV use would be prohibited within 200 meters of water sources. Most sources would still be protected.	Same as Alternative C
Vegetation Management	Maintaining existing vegetative cover would result in average annual soil losses of approximately 460,000 tons from BLM lands in the Roswell Resource Area. Potential for soil and water contamination from chemical treatments is greatest of all Alternatives. Relatively high rates of use of annual plant production would make soils susceptible to water and wind erosion in the short-term.	Achieving the Desired Plant Community (DPC) would reduce average annual soil losses on BLM lands in the Roswell Resource Area by approximately 50 percent (i.e. 230,000 tons). Prohibiting chemical treatments would eliminate soil and water contamination by pesticides, but may result in more severe watershed degradation from alternative management, such as livestock grazing, prescribed fire, or mechanical treatments.	Achieving DPC would reduce soil losses to same levels as Alternative B. Constraints on chemical treatments would reduce the probability of soil and water contamination from current management. Relatively high rates of use of annual plant production would make soils susceptible to water and wind erosion in the short-term.	Achieving DPC would reduce soil losses to same levels as Alternative B. Constraints on chemical treatments would reduce the probability of soil and water contamination from current management. Relatively low rates of use of annual plant production would make soils less susceptible to water and wind erosion in the short-term.	Same as Alternative D.

TABLE 3 (continued)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Implementing Best Management Practices	No similar action	Water quality would be afforded the greatest protection from nonpoint source pollution of any Alternative, but management could be uneconomical, and safe and effective vegetative treatments might be prohibited in some cases.	The emphasis on economics could lead to nonpoint source pollution where costs are considered to be too great.	Requiring that economic returns or environmental benefits exceed any environmental degradation would provide for safe and effective treatments. Cumulative and long-term impacts of nonpoint source pollution would be given careful consideration.	Same as Alternative D.
Assessment of Ground Water Contamination Potential	No similar action	Chance of ground-water pollution would be virtually eliminated, but safe and effective chemical treatments would also be prohibited.	Requiring more detailed environmental information would ensure that chemicals are used only when they are safe and the most effective treatment available.	Same as Alternative C.	Same as Alternative C.

TABLE 3
SUMMARY OF IMPACTS
(TO WILDLIFE RESOURCES)

The most significant impact to wildlife resources are surface disturbing activities affecting crucial wildlife areas such as riparian/wetland areas, threatened/endangered species habitat, big game/upland game habitat, and aquatic habitat. Wildlife distribution and abundance, and overall biological diversity would be afforded through wildlife habitat protection and enhancement, through surface use and occupancy requirement0s, ACEC designations, interdisciplinary activity plans, habitat improvement projects, and other management options.

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Geophysical Operations	Wildlife habitat disturbance would continue to decrease the quality of crucial wildlife habitats and cause displacement of wildlife. Seasonal stipulations would provide short-term protection for the Lesser prairie chicken.	Crucial wildlife habitats would be protected from surface disturbance activities through surface use and occupancy stipulations benefiting crucial habitats and wildlife populations.	Surface use and occupancy stipulations would minimally protect crucial wildlife habitats and would result in long-term declines in wildlife habitat conditions, wildlife distribution and abundance.	Same as Alternative B.	Same as Alternative B.
Oil and Gas Development Mineral Development	Major surface disturbing activities would result in direct loss of wildlife habitat, long-term decrease of habitat quality, and long-term decrease in wildlife distribution and abundance, particularly in the Shinnery Oak/Dune and Riparian/Wetland Community where oil and gas activities are concentrated. Seasonal stipulations would provide short-term protection for the Lesser prairie chicken.	Crucial wildlife habitats would be protected from surface disturbance activities through a combination of surface use and occupancy stipulations and closed/withdrawn areas resulting in long-term benefits to crucial wildlife habitats and populations.	Surface use and occupancy stipulations would minimally protect crucial wildlife habitats and would result in long-term declines in wildlife habitat conditions, wildlife distribution and abundance.	Same as A but would enhance protection of Lesser prairie chicken habitat.	Same as Alternative D.

TABLE 3 (continued)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Lands and Realty Management (ROWs)	Major surface disturbing activities would result in direct loss of wildlife habitat but could result in benefits for wildlife. Retained exclusion zones would benefit wildlife and habitat. Cumulative impacts of all ROW actions in crucial wildlife habitats would result in decreased habitat quality, wildlife distribution and abundance.	Crucial wildlife habitats would be protected from surface disturbance activities through a combination of surface use and occupancy stipulations and avoidance/exclusion areas resulting in long-term benefits to wildlife habitats and wildlife populations.	Crucial wildlife habitats would be avoided when possible resulting in the potential for habitat degradation.	Same as Alternative B.	Same as Alternative B.
Livestock Management	Negative impacts to important wildlife habitat areas would continue on allotments without AMPs. A variety of wildlife habitats would improve under new interdisciplinary AMPs, but would continue to deteriorate under previous AMPs prepared with an emphasis on forage production.	A variety of community types would improve under new interdisciplinary AMPs, particularly the Shinnery Oak/Dune and Riparian/Wetland community types. Long-term benefits to wildlife habitat and populations would result.	Negative long-term impacts to wildlife habitat and populations in all community types would result from an emphasis on livestock production and livestock-oriented range improvement projects.	Same as Alternative B.	Same as Alternative B.

TABLE 3 (continued)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Vegetation Management	Beneficial impacts to wildlife habitat would result from attaining potential plant community structure, where feasible. Vegetation manipulation projects would enhance habitat and wildlife diversity in the areas of control. Emphasis would remain on range condition for livestock production as determined by data collected at range monitoring sites.	Long-term benefits to wildlife habitat would be greater in most community types as wildlife objectives for vegetation condition would be considered. Monitoring sites in key wildlife habitat areas would be established to ensure vegetation objectives are met. Changes in vegetative structure in areas targeted for vegetation manipulation would occur very slowly as chemical control methods would not be implemented.	Same as Alternative B, except chemical control would be used. Beneficial impacts to wildlife habitat would occur more quickly in areas of control.	Same as Alternative B.	Same as Alternative C, except an expanded waiting period in treating adjacent pastures would create more diverse wildlife habitat conditions.
Watershed Management	Same as Vegetation Management, Alternative A.	Implementing BMPs would have significant long-term beneficial impacts to both terrestrial and aquatic wildlife habitat.	Same as Alternative B, except surface disturbing activities would be allowed on slopes greater than 10 percent but less than 30 percent resulting in the potential for aquatic habitat degradation and crucial terrestrial wildlife habitat.	Same as Alternative B, except surface disturbing activities would be allowed on slopes greater than 10 percent but less than 20 percent, reducing the erosion potential and sedimentation of aquatic habitats.	Same as Alternative B.

TABLE 3
SUMMARY OF IMPACTS
(TO ACEC RESOURCES)

There are five areas which require special management due to resource values that are of national significance. These areas were evaluated by RMP interdisciplinary team members to determine if the areas met the criteria of relevance and importance, as set out in regulations 43 CFR 1610.7-2. A summary of the five areas considered to be potential ACECs is found in Appendix 13.

RESOURCE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Oil and Gas Development Mineral Development	Major surface and subsurface disturbing activities would continue to occur in special management areas not currently closed to salable or leasable minerals or withdrawn from mineral entry, resulting in potential loss or degradation of riparian/wetland areas, cultural/historical sites, threatened/endangered species habitat, crucial wildlife habitat areas, and scenic quality.	Designation of five ACECs, totaling about 64,700 surface acres, would protect those resource values which qualified the areas as needing special management. Important wildlife habitat, cultural/historical sites, and scenic quality would be protected in the long term, primarily through stringent surface use and occupancy stipulations, and mineral withdrawals/closures encompassing the entire ACEC.	Same as Alternative B, except the areas would be protected through less stringent surface use and occupancy stipulations. Withdrawals and closures would apply only to specific areas in the ACECs requiring direct protection of valuable resources.	Same as Alternative B.	Similar to Alternative B, except about 52,300 acres would be unavailable for mineral development and about 3,200 acres would remain open to leasing with No Surface Occupancy stipulations.
	About 27,662 acres would remain unavailable for mineral development (Fort Stanton SMA) and 3,984 acres would remain open to leasing with No Surface Occupancy stipulations (Overflow Wetlands WHA). A minor amount of acreage in the Resource Area would be set aside to protect significant resources from mineral development. Resource values found in other special management areas would not have any specific protection resulting in potential irreversible or irretrievable loss of	About 57,150 acres would be unavailable for mineral development and about 4,420 acres would remain open to leasing with No Surface Occupancy stipulation. Significant resource values in the five ACECs would be protected by, primarily, mineral withdrawals/closures, averting irreversible or irretrievable losses of these resources through mineral development.	About 33,140 acres would be unavailable for mineral development and about 28,900 acres would remain open to leasing with No Surface Occupancy stipulations. Protection would still be afforded to substantial portions of the ACECs. Potential long-term degradation of the ACECs could occur through cumulative impacts of activities that would be authorized within the ACEC boundary. Potential irreversible or irretrievable losses could occur.		

TABLE 3 (continued)

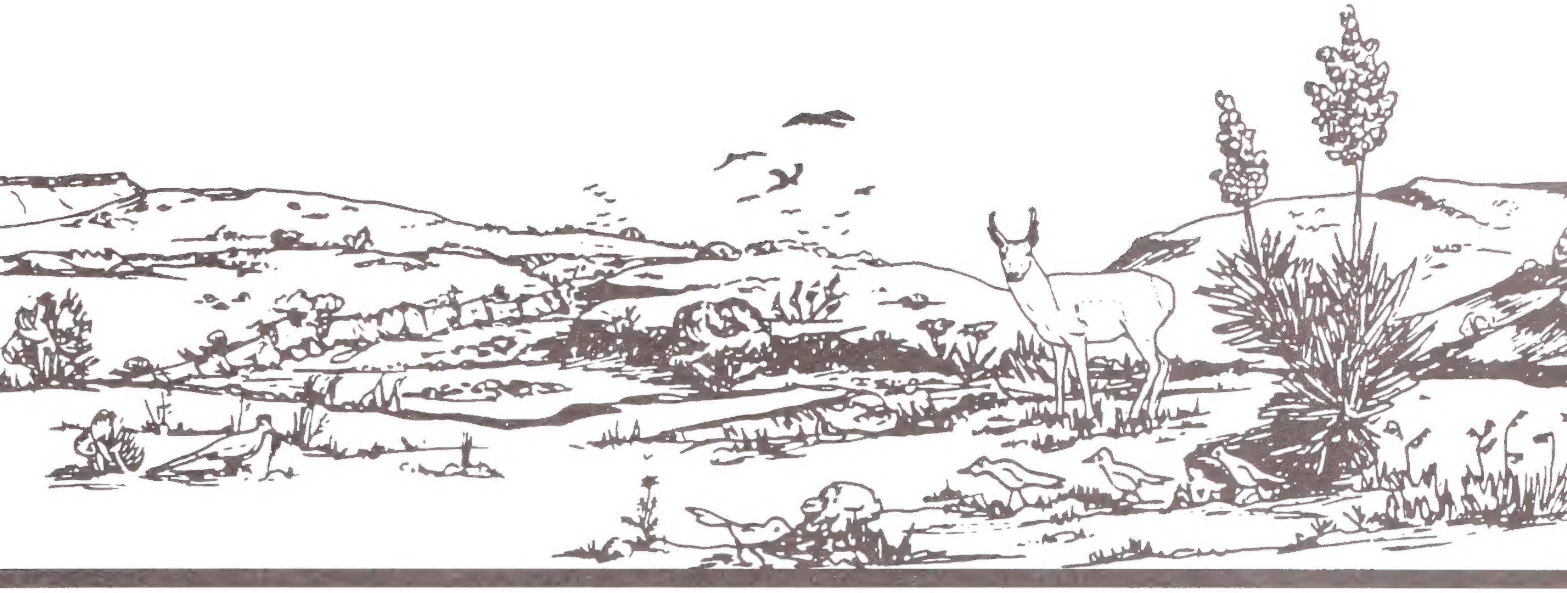
	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
	significant resource values.				
Lands and Realty Management (ROWs)	Rights-of-way would continue to be authorized within special management areas resulting in negative long-term impacts to resource values.	Rights-of-way exclusion areas, totaling about 53,800 acres, would protect all or portions of the five ACECs resulting in the long-term protection of resource values associated with the ACECs. Acquisitions, totaling about 15,360 acres, would further enhance the manageability and protection of the ACECs.	Only 700 acres within the Overflow Wetlands ACEC would be protected with a ROW exclusion designation. The remaining areas within the five ACECs, about 53,100 acres, would be marginally protected with the ROW avoidance designation as major ROW may be allowed. Potential long-term negative impacts to, or degradation of, resource values associated with the ACECs could occur. Acquisitions totaling about 9,480 acres would minimally enhance protection of ACECs.	Same as Alternative B.	Same as Alternative B.

TABLE 3 (continued)

	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Livestock Management	Livestock grazing would continue to occur within special management areas, except 1,838 acres within the Mescalero Sands ONA. The 9-month grazing season at the Fort Stanton SMA would continue, except within the Primitive Area, riparian pastures, and the Rio Bonito Recreation Area. Under the current grazing management scheme at Fort Stanton (bid-basis), the BLM has flexibility in grazing management compatible with other resource values. In other special management areas requiring protection, the current emphasis on livestock production would continue to impair resource values through grazing impacts and range improvements designed to maximize livestock production.	Grazing would no longer be authorized on about 33,500 acres within three ACECs, and would be retired on a portion of another ACEC, resulting in long-term positive impacts to riparian/wetland areas, cultural/historical sites, threatened/endangered species habitat, crucial wildlife habitat areas, and scenic quality associated with the ACECs. Grazing would continue to be authorized in the remaining ACECs but under grazing systems favoring natural resource values.	With the exception of about 1,000 acres associated with the Roswell Cave Complex ACEC, livestock grazing would continue to be authorized in all ACECs under a grazing system favoring livestock production. Livestock grazing would continue to impair resource values through grazing impacts and range improvements designed to maximize livestock production, resulting in the long-term decline of resource values associated with the ACECs. Recovery of riparian/wetland areas and associated uplands would be impeded by the continuation of incompatible grazing practices.	Impacts are similar to Alternative C, except minor changes in season of use at the Overflow Wetlands WHA, exclusion of grazing in sensitive areas at Fort Stanton, and no grazing on an additional 640 acres at Mescalero Sands. The degree of impacts would be less than Alternative C, as grazing systems would be developed to ensure protection of important natural resource values associated with the ACECs.	Same as Alternative B, except grazing and new range improvements would no longer be authorized on about 2,500 acres of the Mescalero Sands ACEC, and grazing systems at Fort Stanton ACEC would be developed to favor enhancement and protection of natural resources and archaeological sites, which may exclude grazing in portions of the ACEC.
Recreation Management	Low intensity recreational developments, as specified in the HMPs for Fort Stanton and the Overflow Wetlands Wildlife Habitat Areas, would result in minimal impacts to sensitive natural resources, and would enhance protection by limiting recreational development and uses to specific areas. Uncontrolled and repeated	Recreational development would increase within the Fort Stanton and Overflow Wetlands ACECs, resulting in long-term negative impacts to natural resources due to increased human visitation and maintenance of developments. Cumulative totals for OHV designations for the five ACECs are about 10,880 acres as closed to OHV	Impacts from recreational developments are the same as Alternative B. About 39,200 acres would be designated as limited to designated roads and trails, resulting in the protection of most natural resources from OHV use. Potential impacts to riparian habitats would remain as these areas would not be closed to OHV use. The magnitude of protection	Same as Alternative C, except about 700 acres within the Overflow Wetlands ACEC would be designated as closed to OHV use to protect significant riparian/wetland habitat.	Same as Alternative C, except about 1,040 acres within the Overflow Wetlands ACEC, and about 2,500 acres within the Mescalero Sands ACEC would be designated as closed to OHV use to protect natural resources associated with the ACECs.

TABLE 3 (continued)

ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
OHV use throughout the five ACECs would continue to degrade natural resources associated with the ACECs resulting in long-term impacts to riparian/wetland areas, cultural/historical sites, threatened/endangered species habitat, crucial wildlife habitat areas, and scenic quality.	use, and 28,300 acres as limited to designated roads and trails, resulting in long-term benefits to the natural resources associated with the ACECs.	is dependent on the density of designated roads and trails within a given area. The potential for illegal OHV use in designated areas remains high, resulting in potential degradation of resources within the ACEC.		



CHAPTER 1 PURPOSE AND NEED

INTRODUCTION

The Roswell Resource Management Plan (RMP) and the Carlsbad Resource Management Plan Amendment (RMPA) evaluate alternative land use plans for the management of public lands and resources, including the federal mineral estate, in the Roswell and Carlsbad resource areas. As discussed in the Summary, this plan addresses the leasing and management of the federal mineral estate, irrespective of the surface management agency or surface owner.

For the Roswell Resource Area, each alternative analyzed in detail represents a complete and reasonable plan which could be used to guide the management of the resource area over the next 20 years. For the Carlsbad Resource Area, each alternative analyzed in detail represents a complete and reasonable plan which could be used to guide the management of oil and gas resources in the resource area over the next 20 years. The ultimate decision reached on the management of oil and gas in the Carlsbad Resource Area will be combined with the management prescribed in the Carlsbad RMP for all other resources to provide a comprehensive plan for the resource area.

The intent of combining the RMP and RMPA in the same document is to allow the consolidation and standardization of management of oil and gas resources among the two resource areas. In the long term, this will simplify management and will improve service to the oil and gas industry, since operating procedures ultimately will be the same in the two resource areas. Having both plans in the same document will facilitate public review and has made more efficient use of the limited resources used in preparation of the two plans.

The process for the development, approval, maintenance, and amendment of RMPs and their associated EISs was initiated under the authority of section 202(f) of the Federal Land Policy and Management Act of 1976 (FLPMA) and section 202(c) of the National Environmental Policy Act of 1969 (NEPA). The process is guided by Bureau of Land Management planning regulations in Title 43 of the Code of Federal Regulations, part 1600 (43 CFR 1600), and Council on Environmental Quality Regulations (40 CFR 1500).

The three-tiered BLM planning process comprises the legislative, land-use planning and activity planning tiers. The legislative tier consists of the current laws, regulations, policies, Executive Orders and directives pertaining to the planning area.

Development of the RMP and RMPA represents the land-use planning phase of the planning process. As such, it prescribes the future resource and land use management for the public lands in the Roswell and

Carlsbad resource areas. It is this process of resource and land use allocations that guides activity planning and daily operations.

The activity planning phase of the process incorporates the resource use decisions of the RMP and RMPA into the specific management guidance for administering the resource areas. During activity planning, the management prescriptions in the resource management plan are applied to specific local areas in developing activity plans (e.g., allotment management plans and habitat management plans), in issuing use authorizations, in identifying mitigation needs, and in other similar plans and actions.

After completion, the Roswell RMP will be kept current through minor maintenance, amendments, or revisions, as demands on resources change, as the resources themselves change, or as new information is acquired. The development of the Carlsbad RMPA is evidence of this process. Once the RMPA is completed, it too will be kept current, along with the remainder of the Carlsbad RMP, in the manner described above.

PURPOSE AND NEED

The purpose for developing the Roswell RMP is to provide a comprehensive framework for managing and allocating use of all public lands and resources in the Roswell Resource Area. This effort is directed at identifying needed changes in the Fort Stanton and East Chaves Management Framework plans (MFP) and the Roswell MFP Amendment resulting from policy and management changes occurring since those plans were written, and to address management of portions of the Resource Area not covered in those plans. This RMP will identify and designate Areas of Critical Environmental Concern. The approved Roswell RMP will supersede all existing management framework plans and other general planning decision documents for the planning area.

The purpose for developing the Carlsbad RMPA is to provide a comprehensive framework for managing and allocating the use of oil and gas resources in the Carlsbad Resource Area. This effort will update oil and gas resource management that is currently described in the Carlsbad RMP, to address changes in policy and management occurring since completion of the RMP. The approved Carlsbad RMPA will supersede the portions of the Carlsbad RMP relating to oil and gas management, and will be integrated into the current Carlsbad RMP.

DESCRIPTION OF THE PLANNING AREA

The Roswell District is composed of the Roswell and Carlsbad resource areas. The Roswell District encompasses the nine counties in the east-central and southeast portions of New Mexico.

The Roswell Resource Area encompasses about 14 million surface acres of all ownerships. There are about 1.5 million acres where both the surface and subsurface is in federal ownership and an additional 8.4 million acres of federal minerals underlying other surface ownerships (see Table 4, Map 1 in pocket, and Map 2). Quay, Guadalupe, Curry, DeBaca, Roosevelt, and Lincoln counties, plus most of Chaves County comprise the Roswell Resource Area.

The Carlsbad Resource Area encompasses about 6.4 million surface acres of all ownerships. There are about 2.2 million acres where both the surface and subsurface is in federal ownership and an additional 1.9 million acres of federal minerals underlying other surface ownerships (see Table 4, Map 1 in pocket, and Map 3). Eddy and Lea counties and the southwest ("bootheel") portion of Chaves County comprise the Carlsbad Resource Area. The acreages in this paragraph and on Table 4 are updates of the acreage summaries that have been in use since the publication of the Draft Carlsbad RMP in 1986. The figures published in the 1986 Draft were based on several sources of information, some of which dated from 1977. The summaries of acreages used in this document are derived from the BLM's Automated Lands and Minerals Records System and the Geographic Information System. Each of these systems contains current land status information.

Topographical features of the Roswell District consist primarily of broad high plains to the east, the Pecos River Valley in the center, and foothills and mountainous terrain to the west. Elevations vary from a high of over 12,000 feet in the Sacramento Mountains to a low of 2,800 feet in the southern valley of the Pecos River.

TABLE 4
ROSWELL DISTRICT LAND OWNERSHIP ACREAGES FOR PURPOSES OF ANALYSIS

Area	Total Acres (All Owners)	BLM-Administered Federal Surface and, Subsurface[1],[4]	Other Surface Owners, Federal Minerals (Oil & Gas)[2],[4]	Other Surface Owners, Federal Minerals (All Minerals)[2]
Roswell District	20,346,000[3]	3,687,000	10,148,000	10,338,000
Carlsbad RA	6,381,000	2,197,000	1,898,000	1,933,000
Roswell RA	13,965,000	1,490,000	8,250,000	8,405,000

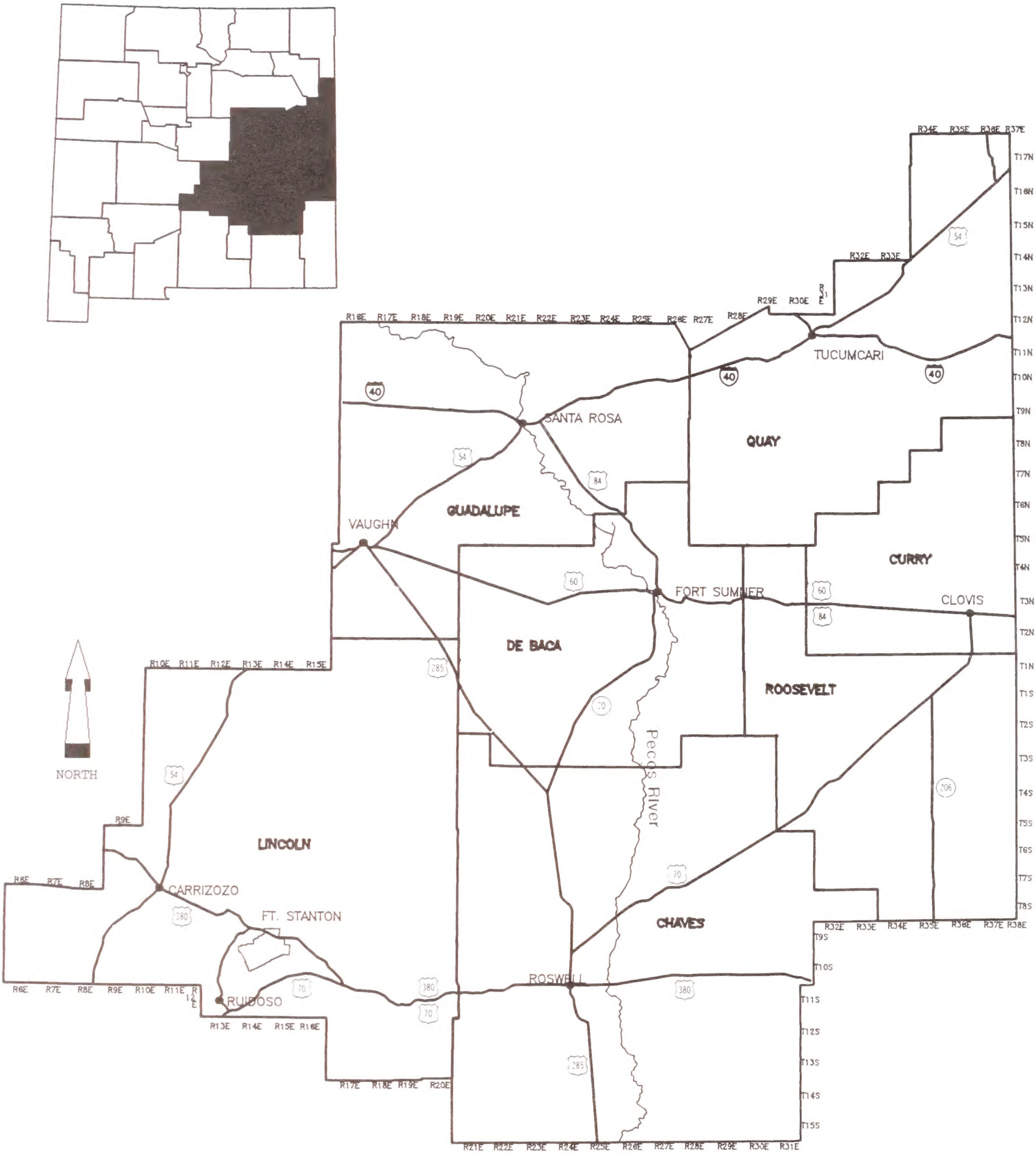
[1] The federal surface/subsurface category assumes all subsurface acres are oil and gas acres. The acres represented are those where both the surface and mineral estate are owned by the Federal government, and managed by the BLM.

[2] Both categories of federal minerals describe split estate where the surface is not administered by the BLM. The acreages represented are mineral estate acres, only.

[3] All acreage numbers are rounded to the nearest thousand.

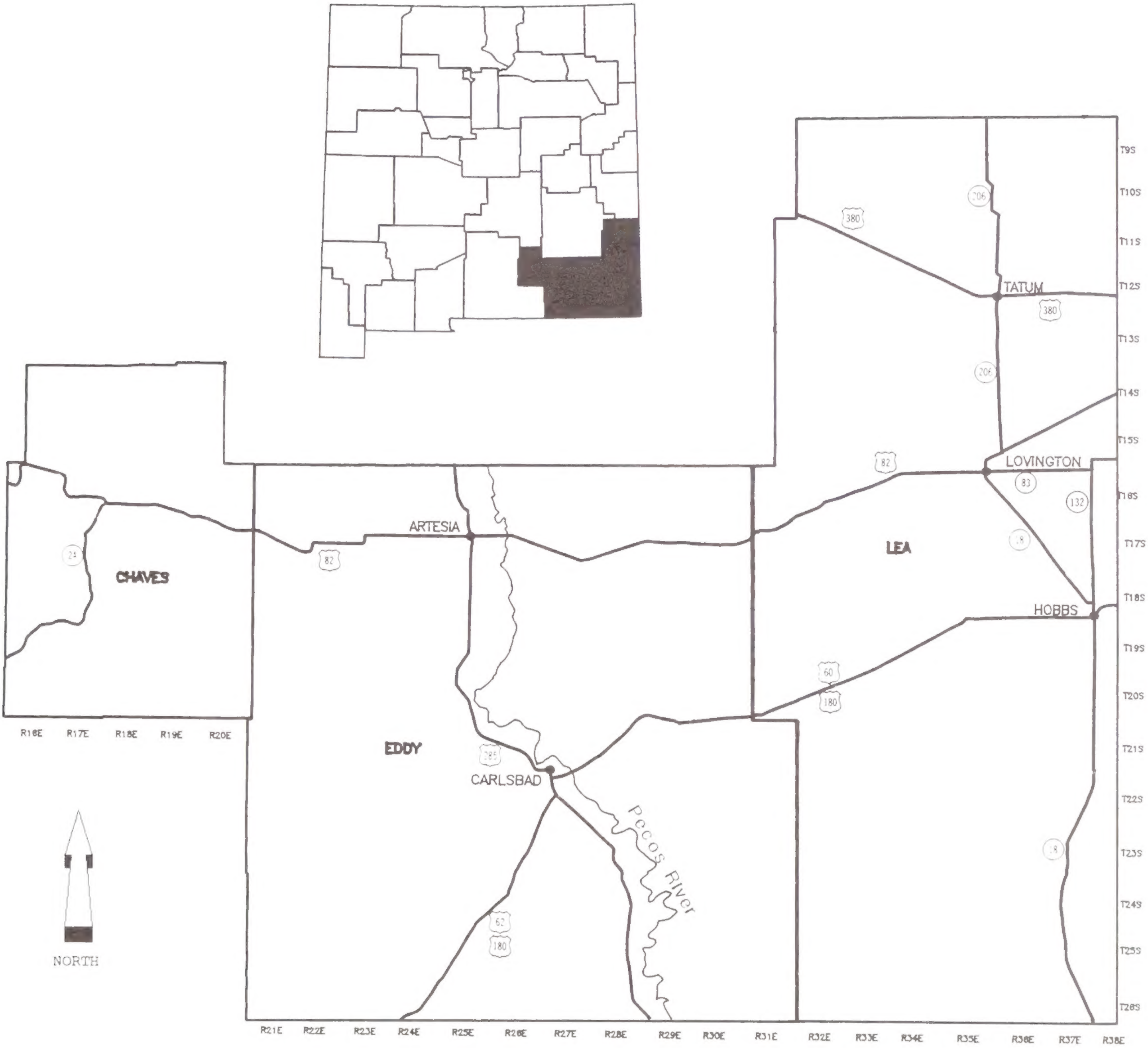
[4] To determine total federal oil and gas acres for a particular area, add acreages in columns 2 and 3.

Source: BLM ALMRS and GIS data, 1994.


NORTH
LINCOLN
GUADALUPE
DE BACA
QUAY
CURRY
ROOSEVELT
CHAVES
SANTA ROSA
VAUGHN
TUCUMCARI
FORT SUMNER
CLOVIS
CARRIZOZO
FT. STANTON
RUIDOSO
ROSWELL
Pecos River
40
54
84
60
285
20
206
70
380
R34E R35E R36E R37E
R32E R33E
R29E R30E R31E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R10E R11E R12E R13E R14E R15E
R9E
R6E R7E R8E
R6E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S
T9S T10S T11S T12S T13S T14S T15S

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 2
GENERAL LOCATION MAP
Roswell Resource Area



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 3
GENERAL LOCATION MAP
Carlsbad Resource Area

The broad high plains area includes lands east of the Pecos River. Most of this area consists of sandy plains that slope to the west. The southwest portion of the plains consists of gypsum hardlands. Ridges and escarpments dissect the sloping and undulating low mesas and plains. The area also contains numerous playas.

The Pecos River valley includes the Pecos River and surrounding floodplain. The valley has river banks and bluffs between 50 and 100 feet high along many segments of the river. The streams entering the Pecos River from the east generally drain only small areas.

The foothills and mountainous terrain areas contain moderately to steeply rolling hills with limestone outcroppings. Dry drainages frequently cut the landscape. Many drainages flow in an easterly or north-easterly direction to the Pecos River.

The climate of the Roswell District is an arid to semiarid continental climate with mild winters and hot summers. Average annual precipitation ranges from 10 to 16 inches. Over half the yearly precipitation falls during July, August, and September when moist air masses move into the region from the Gulf of Mexico. Fall, winter, and spring are relatively dry seasons.

The average annual temperature is 62°F. Maximum temperatures average 92°F in July, although temperatures more than 100°F are frequent. Minimum temperatures average 28°F in January, although temperatures do occasionally dip below 0°F. The average growing season ranges from 220 days in the eastern plains to 154 days in the mountains along the west side of the District.

Wind speeds average about 12 miles per hour (MPH) with the spring months of March through May being the windy season. Dry, gusty winds, predominately from the west, may exceed 50 MPH. These winds, blowing across dry soils, occasionally cause severe afternoon dust storms.

THE PLANNING PROCESS

The BLM's planning process is issue-driven, meaning that planning is undertaken to answer questions and give guidance about specific land management opportunities or problems. Issues, concerns and opportunities are identified at the outset of the RMP process. The different ways of addressing the issues provide the basis for the alternatives considered in the draft RMP. One alternative is identified as the BLM's Preferred Alternative. This document presents the alternatives, with background resource information and an analysis of the impacts of each alternative.

After considering the public's comments on the draft, managers may revise the document, develop a Proposed Plan in place of the Preferred Alternative, and respond specifically to the comments. This work will be published in the Proposed RMP/Final EIS, which will address both the Roswell and Carlsbad resource areas. The public will have an opportunity to review the Proposed RMP and any affected parties who participated in the planning effort may protest any decisions in the Proposed Plan. After any protests on the plan have been resolved, an Approved Plan and Record of Decision will be prepared for the Roswell Resource Area and for the Carlsbad Resource Area.

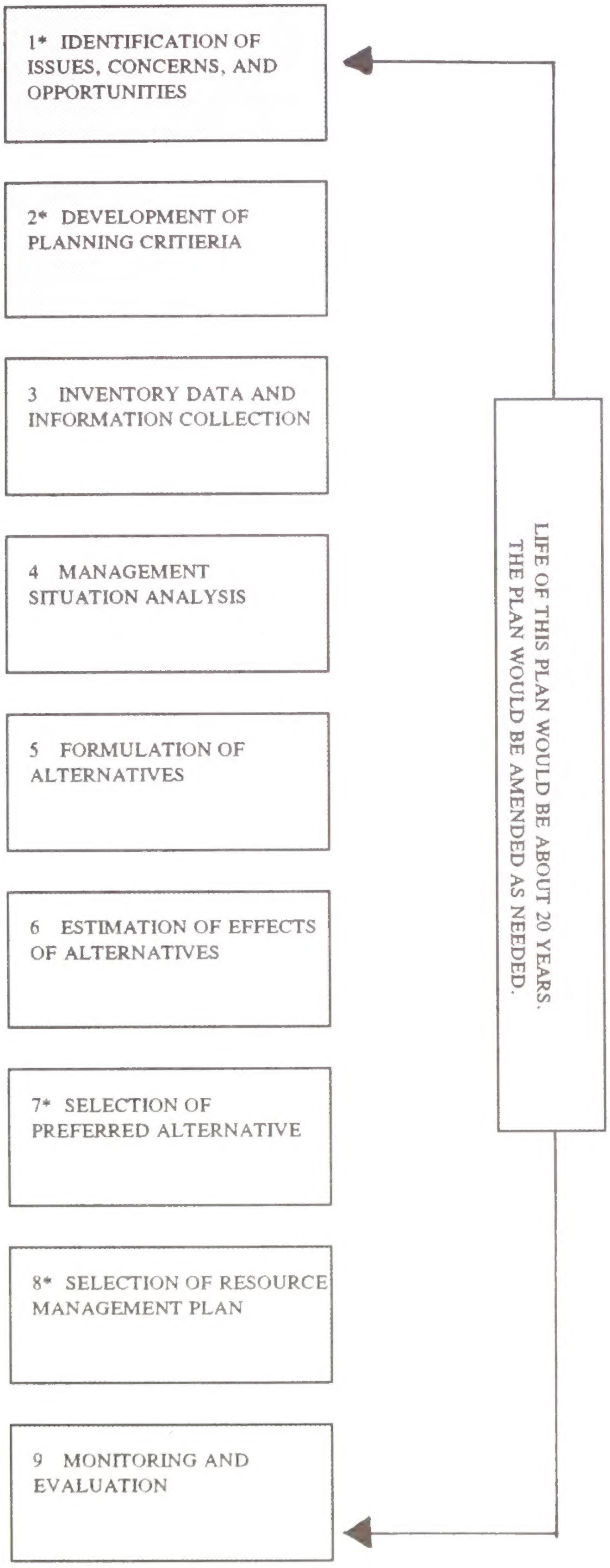
The RMP process consists of nine action steps, which are described in more detail in Figure 1 and Appendix 1. The process is conducted by an interdisciplinary team of resource specialists. Publication of this document is part of Step 7, selection of the preferred management plan.

PLANNING ISSUES AND CRITERIA

PLANNING ISSUES

Planning issues are resource uses or conflicts in the planning area that demand management attention. They are identified by the BLM, or by the public, industry, Indian Tribes, or other federal, state or local agencies, and generally revolve around questions of how the BLM is or should be exercising its discretionary management authority. For every issue there are choices or alternative management responses. The purpose of identifying issues is to help focus the planning effort on those management problems or opportunities that need to be addressed in detail in the plan and its associated EIS. Identification of issues is a preliminary step and issues may be added, modified, or deleted as development of the RMP progresses.

FIGURE 1-1
STEPS IN THE RESOURCE MANAGEMENT PLANNING PROCESS
* Public Participation Opportunities


1* IDENTIFICATION OF ISSUES, CONCERNS, AND OPPORTUNITIES
2* DEVELOPMENT OF PLANNING CRITIERIA
3 INVENTORY DATA AND INFORMATION COLLECTION
4 MANAGEMENT SITUATION ANALYSIS
5 FORMULATION OF ALTERNATIVES
6 ESTIMATION OF EFFECTS OF ALTERNATIVES
7* SELECTION OF PREFERRED ALTERNATIVE
8* SELECTION OF RESOURCE MANAGEMENT PLAN
9 MONITORING AND EVALUATION
LIFE OF THIS PLAN WOULD BE ABOUT 20 YEARS.
THE PLAN WOULD BE AMENDED AS NEEDED.

Of the issues and opportunities identified in this document, the Oil and Gas Issue applies to both the Roswell Resource Area and the Carlsbad Resource Area. The remainder of the issues and opportunities apply only to the Roswell Resource Area. The issues and opportunities were developed with public involvement during the scoping period. The discussion of those issues and opportunities in this document is based on information in the "Issue Scoping Report," which is a summary of the scoping process. The report was prepared in January 1992 and distributed to the public. Planning issues generally:

- Are controversial problems or opportunities about which a decision should be made;
- Are wide-spread in nature and do not apply to a site-specific problem or opportunity;
- Are within BLM authority and jurisdiction;
- Identify choices between alternative management responses.

While issues provide the focal point for development of a plan, there are many other concerns that may not be controversial or do not have alternative choices for resolution. For example, endangered species and cultural resources, by law, must be protected.

Some previously identified issues were not addressed in this plan because they are outside the BLM's jurisdiction, are covered by previous plans, or can be better handled through day-to-day standard operating procedures.

The RMP cannot propose changes in management that are outside the authority or control of the BLM. Examples of this include grazing fees, hunting seasons, or other management that is set by law or regulation, or controlled by other agencies or levels of government.

Issue 1: Oil and Gas Operations

Oil and gas operations occurring throughout the Roswell District (both resource areas) contribute significantly to the local, state, and national economies. Leasing of lands, exploration, drilling, production, well plugging and abandonment, and reclamation activities result from oil and gas operations. These activities affect other resources and the environment.

Questions that need to be answered in the plan regarding oil and gas operations include:

- Which public lands will be open to oil and gas exploration and development subject to the standard lease terms and conditions?
- Which public lands will be open to oil and gas exploration and development, subject to minor constraints, such as seasonal restrictions?
- Which public lands will be open to oil and gas exploration and development, subject to constraints such as No Surface Occupancy or similar major restrictions?
- Which public lands may be subject to several minor constraints that collectively could severely restrict oil and gas exploration and development?
- Which public lands should be closed to oil and gas leasing?
- Which areas have stipulations that are either too restrictive or not restrictive enough to meet the objectives of the RMP/RMPA?
- What standard practices, stipulations and restrictions should be used in areas open to oil and gas leasing, exploration and development?
- Under what circumstances should oil and gas lease stipulations or restrictions be waived?
- Which oil and gas lease stipulations should not be waived without further public review?
- What stipulations or restrictions should apply to geophysical exploration?

Issue 2: Land Tenure Adjustment

The Roswell Resource Area contains scattered or isolated tracts of public lands. Management of these lands often is difficult or uneconomical. There have been many requests made of the BLM to sell or exchange some of these tracts to the citizens using them. Communities have a continuing interest in either purchasing or leasing public land for many diverse uses.

The State of New Mexico, the federal government, counties, citizen's groups and individuals continue to show interest in exchanging lands with the BLM. These exchanges could improve management efficiency for all parties. Exchanges can enhance management of important resources (e.g., endangered species) for public benefit.

The BLM may propose that lands be acquired to meet resource management objectives, national priorities for resource enhancement, and public purposes.

Questions that need to be answered in the plan include:

- Which lands should be retained in public ownership?
- What types of lands should the BLM acquire through purchase or exchange to support its resource management programs?
- Which public lands should be sold or exchanged to improve the BLM's land and resource management efficiency?
- Which public lands meet other disposal criteria?
- What should be the future management of withdrawn lands if these lands are relinquished and the withdrawals are terminated?

Issue 3: Access

The roads owned by the federal government, the State of New Mexico, counties, and individuals provide access to public land. Ownership patterns control access. Less access is available in areas with fragmented ownership patterns; more is available in areas in which the federal land is in sizeable blocks. Developed oil fields usually have abundant road systems.

As use of the public lands has increased, conflicts between different users also have increased. In order to resolve these conflicts, the public has at times requested that the county commissioners remove unneeded county roads from county rolls.

Abandonment of these roads by the county commissions without coordination with the BLM has led to management difficulties. The oil and gas industry also has had difficulty in obtaining access to federal minerals that lie beneath privately-owned surface.

Some sportsmen's organizations and individuals feel that there is too much access in some areas, and that excessive amounts of use of those areas is harmful to wildlife.

Questions that need to be answered in the plan include:

- Where should the BLM provide legal or physical access to, or across, public land and what type of access is needed?
- What actions should the BLM take to provide access to, or across, public land?

Issue 4: Special Management Areas

There are areas, values or resources in the Roswell Resource Area that meet the criteria for protection and management under special management designations, including wilderness, National Natural Landmarks or Outstanding Natural Areas. There are unique resources or values that are in danger of being lost or damaged which would be suitable for special management emphasis under designation as Areas of Critical Environmental Concern.

Questions that need to be answered in the plan regarding these areas include:

- Which areas, values or resources meet the criteria for designation as Natural Areas, Research Natural Areas, Outstanding Natural Areas, Natural Hazard Areas, National Natural Landmarks or Areas of Critical Environmental Concern?
- What should the management be for each ACEC or other special management area?

MANAGEMENT OPPORTUNITIES

Management opportunities are those non-issue related practices or land-use allocations that have proven to need modification. Management concerns focus on use conflicts, requirements, or conditions that cannot be resolved administratively. Management opportunities differ from issues in that they were not raised as issues during the scoping period.

Management Opportunity 1: Recreation

The Roswell Resource Area offers a wide range of extensive (non-facility based) recreational opportunity including: hunting for both big and small game animals; caving; camping; horseback riding; hiking; off-highway vehicle use; mountain biking; watching wildlife; and sightseeing. The resource area contains significant historic and prehistoric sites. These offer major opportunities for scientific study and interpretative recreation.

Intensive recreation use occurs at the Valley of Fires Recreation Area and campground. Water-based recreational activities are the most limited opportunities available in the resource area and are, therefore, in the highest demand.

Questions that need to be answered in the plan include:

- Which public lands should be managed with emphasis on outdoor recreation opportunities?
- What recreation management strategies should be developed and what actions should the BLM take to maintain established recreation opportunities?
- Which public lands should be identified and managed for interpretation of natural and cultural resources and public education (such as back country byways or watchable wildlife areas)?
- Which public lands should be designated as open or closed to OHV use?
- On which public lands should OHV use be limited to existing or designated roads and trails (including washes), to type of vehicle, or to season of use?
- What areas meet the criteria for designation as Special Recreation Management Areas and Extensive Recreation Management Areas and

what management objectives should be established for each area?

- What areas should be designated as recreation-related Areas of Critical Environmental Concern?
- What areas warrant designation as National Wild and Scenic Rivers, National Historic, Scenic, or Recreational Trails or National Recreation Areas?

Management Opportunity 2: Wildlife Habitat Management

Pronghorn antelope and mule deer are the most important big game species in the Roswell Resource Area. Habitat for these species requires management to provide sufficient food, cover, water and the proper arrangement of these habitat factors. Land use activities for other resources, such as livestock grazing, oil and gas development with associated roads, and off-highway vehicle use, can affect the quality of available habitat in the same area.

Riparian and wetland areas are scarce and provide habitat for a large variety of wildlife including numerous waterfowl and riparian plant species. Other resource uses, such as camping, picnicking, livestock grazing, sightseeing, and hunting, can affect these habitats.

Several special status wildlife and plant species may occur in the Resource Area. The BLM must protect these species and their habitats. The use of resources may also affect these species or their habitat.

Land use activities such as rights-of-way, roads, pipelines, and vegetation manipulation can create small islands of habitat. This situation may affect species with a limited habitat such as the lesser prairie chicken.

Questions that need to be answered in the plan include:

- Which wildlife species and habitats should receive management priority?
- Where is the wildlife habitat, what is its current condition, and what is its potential?
- What wildlife habitat maintenance, improvement, and expansion objectives should the BLM establish?
- What actions should the BLM take to achieve the management objectives for priority habitats?
- What management prescriptions are needed to protect or restore riparian, aquatic, and wetland habitat areas?
- Where should the BLM focus its efforts to secure instream flows for maintenance of riparian habitat?
- What actions should the BLM take to improve habitat conditions, aid in recovery efforts, and resolve resource conflicts for listed, proposed and candidate threatened or endangered species?

PLANNING CRITERIA

Planning criteria are the constraints or guidelines that are developed to focus and direct the development of the alternatives, the analysis of effects of the various actions, and the selection of a resource management plan. Planning criteria were derived from laws and regulations, BLM manuals and directives, concerns expressed in meetings, and consultations with both the public and other agencies. The following planning criteria were used in the development of alternatives.

- Input from, and coordination with, federal state and local agencies, the scientific community, industry, and individuals.
- Assure consideration of plans of other Federal agencies, State and local governments, and Indian tribes.
- Effects of consumptive resource uses on other resource values and uses.
- Effects of closing or otherwise restricting use of public lands or resources.

- Effects of environmental protection requirements as stipulations on leases, as conditions of approval on authorizations and as constraints on BLM activities.
- Success of protective stipulations or restrictions in attaining the management objectives.
- Land and resource management efficiency.
- Existing resources and values and their current and potential use.
- Availability, needs and preferences for public and administrative access.
- Extent and size of public land parcels.
- Effects of designations or non-designations on other resources and uses.
- Manageability of an area to accomplish the objectives of a designation.
- Extent and conditions of species and habitats of high public or scientific interest.
- Maintenance or enhancement of biological diversity.
- Species population goals and habitat requirements.
- Condition and trend of vegetative communities.
- Service to the public (e.g., meeting community needs).
- Public interest and attitudes.
- Public health and safety.
- Social and economic effects.
- Costs associated with each alternative.

PLANNING CRITERIA FOR SPECIAL SITUATIONS

Hydrocarbon Potential

A special set of criteria was developed relative to the leasing of hydrocarbons, to aid in the development of alternatives. The Roswell District was divided into regions of high, moderate, and low potential for hydrocarbon occurrences. This delineation was made by inference from available geologic information, reports of past production, review of literature, and information from industry and state agencies. The resulting broad classifications were used in the design of alternatives, to minimize the impact on the development of hydrocarbons or to minimize the impacts of hydrocarbon development on other resources, values and uses, while following the management prescriptions for each alternative. Because they are so broad, these classifications are not intended to predict future activity or the locations of new discoveries.

This information, with analysis of past mineral activity and production, was used to develop Reasonably Foreseeable Development (RFD) scenarios for fluid mineral development. These scenarios are used as assumptions to aid in the analysis of impacts. Various discussions in this document make up the RFD. Chapter 2 contains the alternatives for oil and gas development in terms of which areas will be open to leasing and development of oil and gas, and the restrictions that may be imposed on development. In Chapter 3 is a brief discussion of the oil and gas resources in the Roswell District and of the geology in both the Carlsbad and Roswell resource areas. Chapter 4 discusses the impacts of proposed management options on oil and gas development. Appendixes 3, 4 and 5 contain the guidelines and requirements for oil and gas development and operation. Appendix 15 is an overview of oil and gas operations. Appendix 18 contains the projections for future development (the reasonably foreseeable development) of oil and gas wells in the Roswell

District and the assumptions used in determining the impacts discussed in Chapter 4.

Wild and Scenic Rivers

The streams and rivers in the Roswell Resource Area were inventoried for their eligibility and suitability for inclusion in the National Wild and Scenic River System. The evaluation criteria and results of the evaluation are in Appendix 2. There are no stream or river segments in the resource area recommended for nomination for inclusion in the National Wild and Scenic River System.

Animal Damage Control

The topic of animal damage control (ADC) is not addressed in the Roswell RMP. The ADC program is administered by the Department of Agriculture. The BLM assesses environmental impacts of proposals made by the Department in its annual ADC plans. Each plan addresses areas and methods of control and is formulated to meet the short-term (annual), site-specific needs for ADC. Because the scope of the RMP is to provide general guidance over the long term (20 years), it was decided to continue with the practice of annual review and approval of ADC plans instead of attempting to generalize control areas and methods by predicting future needs for ADC in the RMP.

Black River Management Area

During the development of the Carlsbad RMPA, consideration was given to designating the Black River Management Area (BRMA), southwest of Whites City, as an Area of Critical Environmental Concern (ACEC).

In January, 1992, the BLM completed the acquisition of 930 acres of the 1260-acre BRMA, through an exchange with The Nature Conservancy. The BRMA is at the headwaters of the Black River and includes over three miles of river reach and adjacent lands on both sides of the river. Because this exchange was for surface ownership only, the federal government does not own the mineral estate on that portion of the BRMA. The remaining 330 acres in the BRMA are public lands where the BLM administers both the surface and sub-surface estate. The BLM acquired these lands because of their outstanding riparian values, which are in pristine ecological condition. The area provides habitat for various wildlife species including big game, upland game, neotropical migratory birds, waterfowl and special status species. The area also provides excellent sport fishing opportunities for a warm water fishery, and opportunities for photography, hiking, and watching birds and wildlife. The BRMA also is ideally suited for the development of an environmental education program.

A Coordinated Resource Management Plan for the Black River Management Area was approved by the Carlsbad Area Manager in September, 1992. The BLM's management goal for Black River, as established in the CRMP is:

> *To enhance the quality of riparian and aquatic habitat, reestablish native fisheries and maintain sport fisheries, and develop a recreation/environmental education site. This will be accomplished in a way that will provide recreational and educational opportunities and improve the river system thereby enhancing the special status species habitat and recreation benefits.*

The BLM recognizes the uniqueness of the Black River Management Area and has developed management prescriptions that will afford this area the special attention it warrants. The BRMA may meet the criteria to be designated as an Area of Environmental Concern (ACEC) or some other type of special designation.

However, it was determined from the consideration given to the BRMA during development of the Carlsbad RMPA, that the oil and gas amendment was not the appropriate forum in which to address a special designation for the BRMA. It was decided that a special designation for the management area will be addressed at the earliest opportunity, as an issue in an amendment or revision of the Carlsbad RMP.

Land Tenure Adjustment

To facilitate the planning process, the Roswell Resource Area was divided into three zones, based on land ownership patterns (see Map 4). Zone 1 includes the better-blocked public surface lands in Chaves, Lincoln, Guadalupe and DeBaca counties. Zone 2 includes the scattered public lands in Chaves, Lincoln, DeBaca, and Guadalupe counties. Zone 3 includes the very scattered lands in Curry, Quay, and Roosevelt Counties.

In Zone 1, the management philosophy is to retain the public lands in federal ownership. However, exchanges may be used to create better-blocked land ownership patterns and facilitate better resource management. Sales and disposals for public purposes also could be used to facilitate better management in Zone 1, in some cases. Lands acquired anywhere in the resource area will be managed for retention, irrespective of their location.

In Zone 2, the management philosophy is to dispose of public lands, primarily through exchange. Sales and disposals for public purposes also could be used, in some cases. When possible, exchanges of public lands for private lands will be conducted in the same county, to minimize the impacts to PILT payments and property taxes.

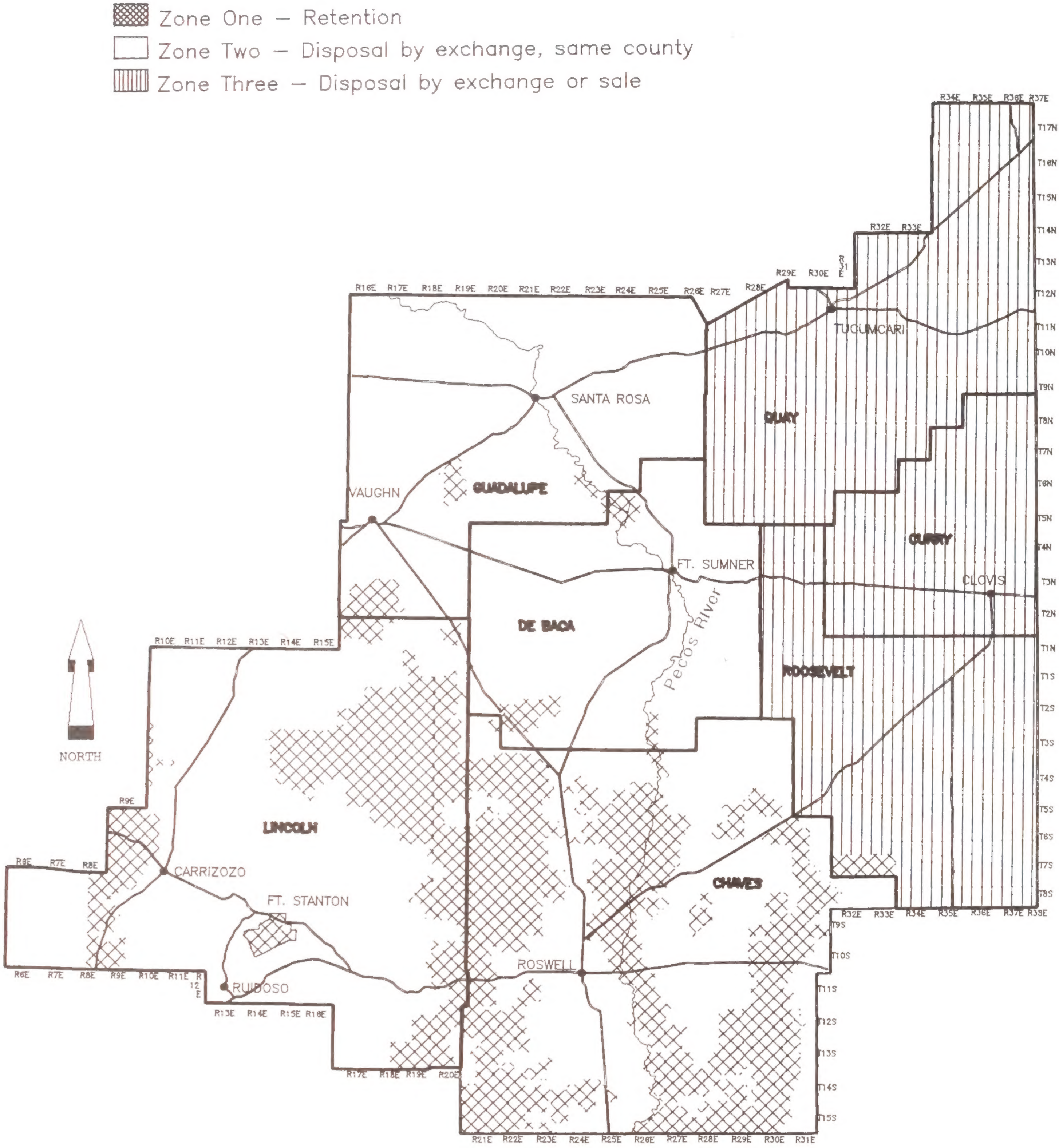
In Zone 3, the management philosophy will be to dispose of the public lands either through exchange or sale.

Lands in Zones 2 and 3 identified for retention during the inventory, planning, or land disposal processes, will be managed as if they are in Zone 1. Reasons for retention include the presence of T&E habitat, critical wildlife habitat, unique historical or cultural resources, or riparian areas.

Withdrawals and Classifications

Section 204(l) of the FLPMA requires the BLM to periodically review withdrawn and classified lands to determine whether existing withdrawals and classifications are serving their intended purposes and if they continue to be needed. These reviews and the resulting determinations are not a part of the BLM planning process. The retention or termination of a withdrawal or classification does not require a land use planning decision. However, deciding how the involved lands are to be managed if or when a termination occurs may require a land use planning decision.The Roswell RMP and the Carlsbad RMPA both address the management options for lands currently covered by withdrawals or classifications, whether those lands are under BLM jurisdiction or the jurisdiction of another federal agency. Management is proposed both to cover the possibility that the lands would remain withdrawn and to cover the eventuality that withdrawals on those lands would be terminated.

Riparian enhancement projects improve vegetation, and the quantity and quality of water.



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 4
LAND TENURE ADJUSTMENT ZONES
Roswell Resource Area

Coal Leasing

Coal leasing and development is not an issue for this RMP. The coal in the Roswell Resource Area has either unknown or low development potential in the foreseeable future. No leasing and development interest was identified during the call for coal resource information, the issue identification process, or during the formulation of alternatives. Therefore, the coal screening process, including the application of unsuitability criteria, has not been conducted. This does not mean, however, that coal exploration, leasing and development is incompatible with this plan. Coal exploration would be allowed under the Surface Use and Occupancy Requirements adopted in this RMP. If an application for a coal lease is received in the future, an appropriate land-use and environmental analysis, including the coal screening process, would be conducted to determine whether or not the coal areas applied for are acceptable for development and for leasing consideration. The RMP would be amended as needed.

The federal coal lands in the Roswell Resource Area are not within a designated coal production region. Federal coal leasing in areas outside of designated regions may be considered apart from the competitive leasing process set out in 43 CFR 3420. In this situation, coal leasing is done on a case-by-case basis called "Leasing on Application," under the appropriate provisions of 43 CFR 3425. The sale and issuance of federal coal leases under these provisions is still done through a competitive bidding process.

Livestock Grazing

The East Roswell Grazing Environmental Impact Statement and the Roswell Resource Area Management Framework Plan/Environmental Impact Statement provide program guidance for the grazing of livestock on public lands in the Roswell Resource Area. Review of those documents revealed that decisions rendered in those documents still were applicable in most cases. Current decisions allow flexibility to meet resource management objectives. Therefore, comprehensive, resource area-wide allotment categorization, stocking rates, seasons of use, and class and kind of livestock are not addressed in this plan. Topics related to livestock grazing that are addressed in one or more alternatives in this plan include the possibility of restricting or eliminating livestock grazing in some areas, allotments, or situations, conducting vegetation treatment to increase forage, installing rangeland projects to benefit livestock grazing, and modifying some existing rangeland projects.

Surface Use and Occupancy Requirements

The Surface Use and Occupancy Requirements in Appendix 3 were developed in recognition of the fact that all uses of the public lands should be subject to similar kinds of environmental protection requirements. These requirements were used in the development of the RMP/EIS: (1) as part of the planning criteria for developing the alternatives and for determining mitigation requirements to be included in the approved RMP; and (2) for developing alternatives and analyzing the impacts of the alternatives.

These requirements are intended to attain consistency between the Roswell and Carlsbad Resource Areas in mitigating the impacts of oil and gas exploration, drilling and production. These requirements will be applied, when necessary, to oil and gas leases prior to sale.

The use of the requirements in the Roswell Resource Area also will provide consistency between requirements placed on oil and gas operations and requirements placed on other uses of the public lands. It is hoped that these requirements will eventually be adopted for use in the Carlsbad Resource Area for all uses of the public lands.

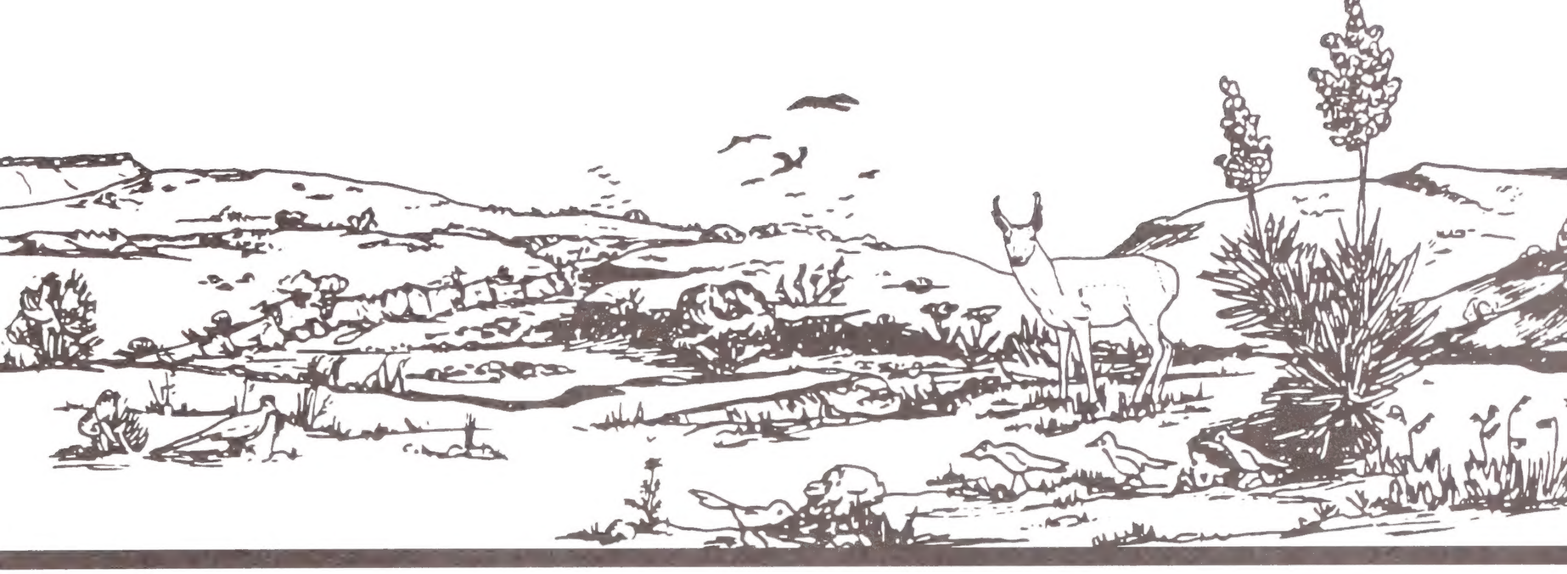
The requirements are essentially mitigations to be applied prior to incurring impacts. They are applied to protect important wildlife habitat, slopes and fragile soils, wetland or riparian areas, caves and karst, visual resources, and certain wildlife species.

When needed, surface-disturbing activities would be subject to one or more of the mitigations listed in the Surface Use and Occupancy Requirements. On lands where the federal surface is administered by other agencies and the federal mineral estate is administered by the BLM, the requirements would be applied where the surface managing agency has not developed other surface protection mitigations or stipulations. These requirements would be applied to land surface areas that are privately owned or owned by the State of New Mexico or local governments only in cases where those lands overlie BLM-administered federal minerals and only in situations where the actions authorized by the BLM could: (a) cause adverse on-site or off-site effects on threatened or endangered or candidate species, or on cultural resource values; or (b) cause adverse off-site effect on any resource values on any other lands.

The Surface use and occupancy requirements ultimately included in the approved RMP could later be waived, modified, excepted or combined with other conditions of resource use (a) as a result of addressing situations beyond the analysis level of the RMP/EIS (such as activity plans or site-specific project proposals), (b) if the conditions that originally warranted a restriction (such as the presence of an active raptor nest) no longer exist, or (c) if the location of a proposed activity or use were moved to avoid such conditions. Surface use and occupancy requirements that are not identified in the approved RMP could be developed and applied to address situations or resource values either not present or not identified at the time the RMP was developed, but that are later identified through site-specific investigations (such as a newly discovered raptor nest or a newly located cave). Additions or modifications of mitigations generally would be allowed when the modified conditions of use do not prohibit the exercise of valid existing rights.

Desired Plant Community

The Roswell RMP is one of the first BLM land use plans to address the concept of desired plant community (DPC). Desired plant community can be considered a component of ecosystem management, because it addresses the management of large areas of land having a common plant community. The alternative descriptions of vegetation condition in this plan represent a move away from the more conventional seral condition stages (e.g., good or fair) to vegetation condition objectives based on the capability of range sites to produce desired vegetation to meet management objectives. The DPC identifies management goals for vegetation communities in terms of percentages of the four vegetation components--grasses, forbs, shrubs and trees. These goals, which address the requirements for providing watershed protection, wildlife habitat and forage, and livestock forage, may be met through natural succession, management action, or both. Appendix 11 contains background information about DPC.



CHAPTER 2 ALTERNATIVES

INTRODUCTION

ALTERNATIVE FORMULATION

The basic goal in formulating RMP alternatives is to identify various combinations of public land uses and resource management practices that respond to the planning issues. Each alternative represents a complete and reasonable multiple-use plan to guide future management of public land and resources. One alternative represents "no action," which is the continuation of present management. Other alternatives provide a range of choices for solving the problems associated with present management. Problems with present management are identified through scoping and issue identification for the planning process, including public involvement. Changes in present management may also be needed as the result of changes in policy or law.

The analysis of impacts that would result from each of the alternatives is required by BLM planning regulations and the NEPA-based Council on Environmental Quality (CEQ) regulations. It is that analysis that permits managers to choose the alternative, or combination of alternatives, that becomes the preferred alternative.

This chapter presents five resource management alternatives, including the BLM's preferred alternative. The alternatives are arranged in order from A through E. Alternative E, the BLM's preferred alternative, generally allows resource use with greater emphasis on protection of the natural environment than Alternatives A, C, or D. Alternative B is more oriented toward environmental protection than any of the other alternatives, including Alternative E, but still allows for resource use. Alternative A is the continuation of current management and is the "no action" alternative required by the CEQ regulations. Alternative C generally emphasizes the use of resources but provides a minimal level of environmental protection, as well. Alternative D is a balance between Alternatives B and C.

ALTERNATIVE CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The following alternatives are possible methods of resolving planning questions or issues. They were eliminated from detailed study because they were unreasonable or not practical given technical, legal or policy constraints.

Elimination of Livestock Grazing

The elimination of livestock grazing from all public lands in the Roswell Resource Area is a possible method of resolving some of the planning issues related to the management of vegetation, soil and wildlife. However, resource conditions on the BLM-administered public lands in the planning area, including livestock forage, watershed, and wildlife habitat, do not warrant a resource area-wide prohibition of livestock grazing. It was determined that existing guidance for livestock grazing in the East Roswell Grazing Environmental Impact Statement and the Roswell Resource Area Management Framework Plan/Environmental Impact Statement is still applicable in most cases, and those decisions allow the flexibility to meet resource management objectives. (Refer to a related discussion of Livestock Grazing in Chapter 1, Planning Criteria for Special Situations.)

Elimination of Leasing for Oil and Gas

Closing the Carlsbad and Roswell resource areas to the leasing of oil and gas resources could resolve conflicts with other resource uses. This option was not considered in detail because it is contrary to BLM policy that public lands generally remain open and available for mineral exploration. This option also is contrary to the multiple use management mandates of FLPMA.

Maximum, Unconstrained Alternatives

Alternatives that propose maximum resource area-wide development, production or protection of one resource at the expense of other resources could resolve conflicts in some instances. However, the purpose of the approved RMP is to provide multiple use management guidance for the planning ·area. Promoting a single land and resource use by eliminating all others does not meet the objectives of the BLM's multiple use management mandate and responsibilities. The alternatives analyzed in detail do, however, include various options for eliminating or maximizing individual resource values or uses in specific areas where conflicts exist.

MANAGEMENT COMMON TO ALL ALTERNATIVES

Some management actions described in this section reflect ongoing management that is deemed adequate and would remain unchanged no matter which alternative is chosen as the preferred alternative. Other management actions in this section were developed as parts of the various alternatives. The characteristics of those actions are such that they will remain the same under any alternative. Thus, the following management guidance is applicable to, and constitutes a part of, each alternative. It is presented here to avoid repetition.

In this section, management proposed for the Carlsbad Resource Area is found only in the Fluid Minerals Management section under the Minerals Management heading and in appendixes referenced in that section. All other proposed management in this alternative is for the Roswell Resource Area. The term "resource area" applies to the Roswell Resource Area.

MINERALS MANAGEMENT

Fluid Minerals Management

ROSWELL DISTRICT

The BLM would continue to require oil and gas lessees to conduct operations in a manner that would minimize adverse impacts to resources, land uses, and users. To that end, the BLM would continue to apply reasonable measures, including, at a minimum, relocating proposed operations by no more than 200 meters or prohibiting new surface disturbance for a period of no more than 60 days.

Requirements that have been issued in Orders or Notices to Lessees (NTL) concerning environmental and other factors associated with the drilling of oil and gas wells would continue to be enforced, as would future orders and NTLs.

In addition to any special stipulations, the development of new and existing leases would be further guided by the application of the Roswell District Standard Conditions of Approval (Appendix 4).

Open-top tanks, reserve pits, disposal pits, or other open pits would be required to be covered with a fine mesh netting to make them inaccessible to birds, bats or other wildlife.

Areas designated as Wilderness Study Areas (WSAs) are closed to leasing as part of the Wilderness Interim Management Policy. Existing leases in WSAs would not be reissued once they expire. Even if the WSAs are not designated as wilderness by Congress, all WSAs in the Roswell District would remain closed to leasing, with the exception of about 1,060 acres in the Mudgetts WSA that lie north of the cave protection zone identified in the Dark Canyon Environmental Impact Statement (see Map 5). Management of the part of the Mudgetts WSA that could eventually be opened to leasing would be governed by the Surface Use and Occupancy Requirements, the Practices for Oil and Gas Drilling Operations in Cave and Karst Areas, and the Roswell District Conditions of Approval. Refer to the descriptions of the alternatives for specific information on the management of this area.

Cultural sites determined to be eligible and potentially eligible to the National Register of Historic Places would be protected from damage by avoidance. Potentially eligible sites would be tested to determine their eligibility and mitigation such as data recovery would be required for eligible sites if avoidance could not be accomplished.

As a standard practice, ephemeral and perennial drainages and wetland/riparian areas would be avoided as locations for oil and gas related facilities, including drilling locations, production facilities, roads, and pipelines. Whenever possible, facilities would be confined to existing alignments or locations, minimizing width requirements and maximizing multiple occupancy.

As a standard practice, pipelines associated with oil and gas exploration, development, production and transportation would be buried. Pipelines with a pressure greater than 125 psi must be buried and preferably be constructed of steel. If the use of plastic pipe is approved, the pipe must meet American Petroleum Institute specifications for polyethylene pipe. All permanent plastic pipelines must be buried. A waiver of the requirement to bury all pipelines would be considered in the following situations:

- Short distance steel pipelines authorized on-lease, if they carry pressure below 125 psi and are less than two inches in nominal diameter. Pipelines would have to be buried at road crossings. Where a pipeline is exposed, painting would be required in accordance with the painting policy (see Appendix 3). Waiver of requirements for painting would be considered when short distances are involved or when a pipeline is not readily visible because of screening.

- The temporary (one year or less) surface installation of plastic pipelines, after considering the length of the pipeline, its proposed location, the potential hazards present (e.g., likelihood of damage by fire or OHV use), the characteristics of the pipe regarding deterioration (including by sunlight), the ASTM or similar specifications for the pipe, the intended use of the pipeline, and other appropriate factors.

- Where rock outcrops at the surface make the burial of a pipeline impractical, such as when unreasonable and unreclaimable surface disturbance would result. Where the pipeline is exposed, painting would be required in accordance with the painting policy for visual resource management areas.

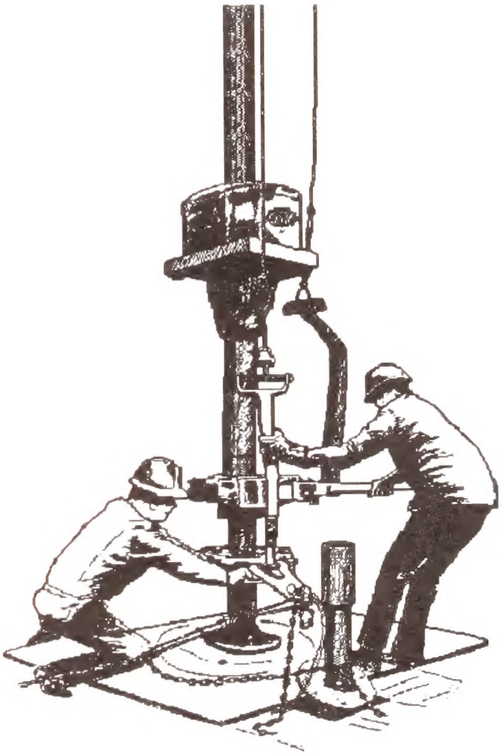
- Where the surface ownership along the pipeline route is mixed, and the majority of surface ownership is not public. In those cases, the installation of pipelines on public land would conform to the practice to be employed on the remainder of the pipeline, unless special resource management concerns dictate strict adherence to this policy.

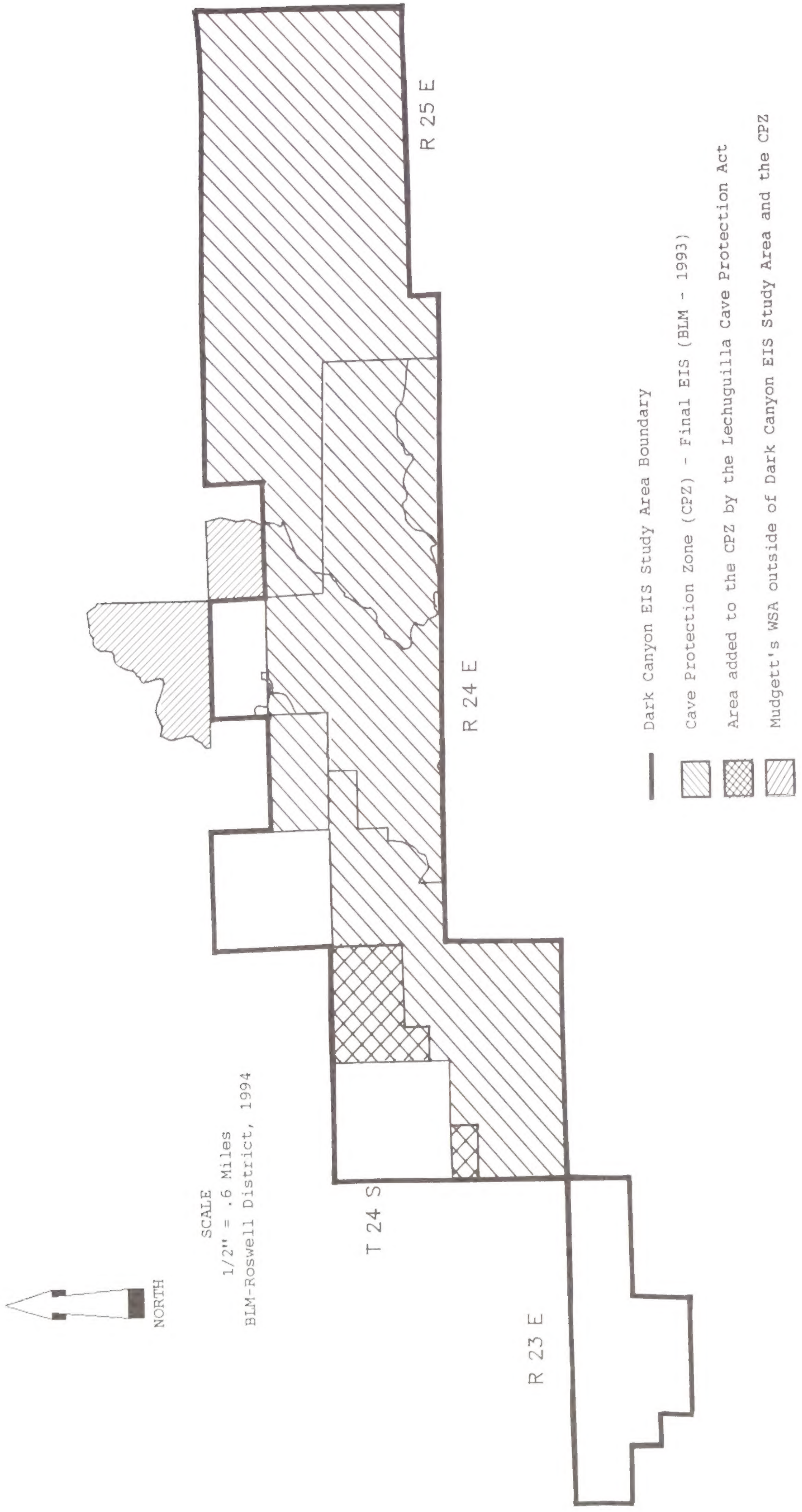
CARLSBAD RESOURCE AREA

The portions of the 497,000-acre potash area open to future leasing for oil and gas would continue to be leased with the Potash Stipulation. Generally, the Potash Stipulation allows drilling for oil and gas if the drilling does not interfere with potash mining, does not create undue waste of potash, and does not create a hazard. In abandoning wells drilled under the stipulation, infiltration of oil, gas or water into potash deposits, mines or workings must be prevented.

Lease notices would be used to alert lessees to potential special requirements on exploration, drilling or production. Lease notices covering protection of potential cave or karst areas, protection of threatened or endangered or sensitive plant or animal species, and the use of the Alkali Lake and Hackberry Lake OHV areas would remain in use. Additional lease notices would be developed as needed.

The Record of Decision for the Dark Canyon Environmental Impact Statement (1994) would guide the management of oil and gas resources in a portion of Dark Canyon just north of Carlsbad Caverns National Park (see Map 5). The actions mandated by the record of decision are summarized below:





| Dark Canyon EIS Study Area Boundary
▨ Cave Protection Zone (CPZ) - Final EIS (BLM - 1993)
▩ Area added to the CPZ by the Lechuguilla Cave Protection Act
▨ Mudgett's WSA outside of Dark Canyon EIS Study Area and the CPZ

SCALE
1/2" = .6 Miles
BLM-Roswell District, 1994

MAP 5
DARK CANYON AREA
Carlsbad Resource Area

- close the entire EIS Study Area (about 8,320 surface acres) to future oil and gas leasing;
- existing leases in the EIS Study Area subject to a NSO stipulation would remain subject to the restriction;
- producing or producible wells in the EIS Study Area may continue to produce and be maintained for that purpose;
- existing leases in the EIS Study Area outside the cave protection zone (CPZ) (about 3,280 surface acres) that are available for surface occupancy and development would be subject to prescribed mitigation measures;
- existing leases or portions of existing leases inside the CPZ (about 9,760 surface acres) would not be available for surface occupancy, but may be developed using directional drilling from outside the CPZ.

The reader should refer to the Final Dark Canyon Environmental Impact Statement and Record of Decision for specific information on the management of the Dark Canyon area.

The Lechuguilla Cave Protection Act of 1993, establishes a cave protection zone (see Map 5), which conforms to the cave protection zone established in the Dark Canyon Environmental Impact Statement, except that an additional 360 acres are included, making this CPZ about 10,120 (surface) acres in size. Among the requirements of the Act is the withdrawal of the lands in the CPZ from mineral and geothermal leasing.

The Dark Canyon Scenic Area and ACEC (3,220 acres), and the Manhole Caves (100 acres), and Mudgetts Caves (50 acres) special management areas would be managed according to the Record of Decision for the Dark Canyon Environmental Impact Statement, which is summarized above.

Unless otherwise authorized, surface use or occupancy would be excluded in the 25,600-acre East Guadalupe Escarpment Habitat Management Area (see Maps 10 and 16) as follows:

1. Within 400 meters of:

- Existing and proposed wildlife watering sites;
- Riparian areas, wetlands, springs, water wells, and ephemeral, intermittent, or perennial streams;
- Raptor nests which have been active for the past two years.

2. Slopes over 30 percent, or over 20 percent on extremely erodible or slumping soils.

3. Identified flood hazard zones.

These management prescriptions would supersede the Surface Use and Occupancy Requirements (Appendix 3) that normally would be applied to the Habitat Management Area.

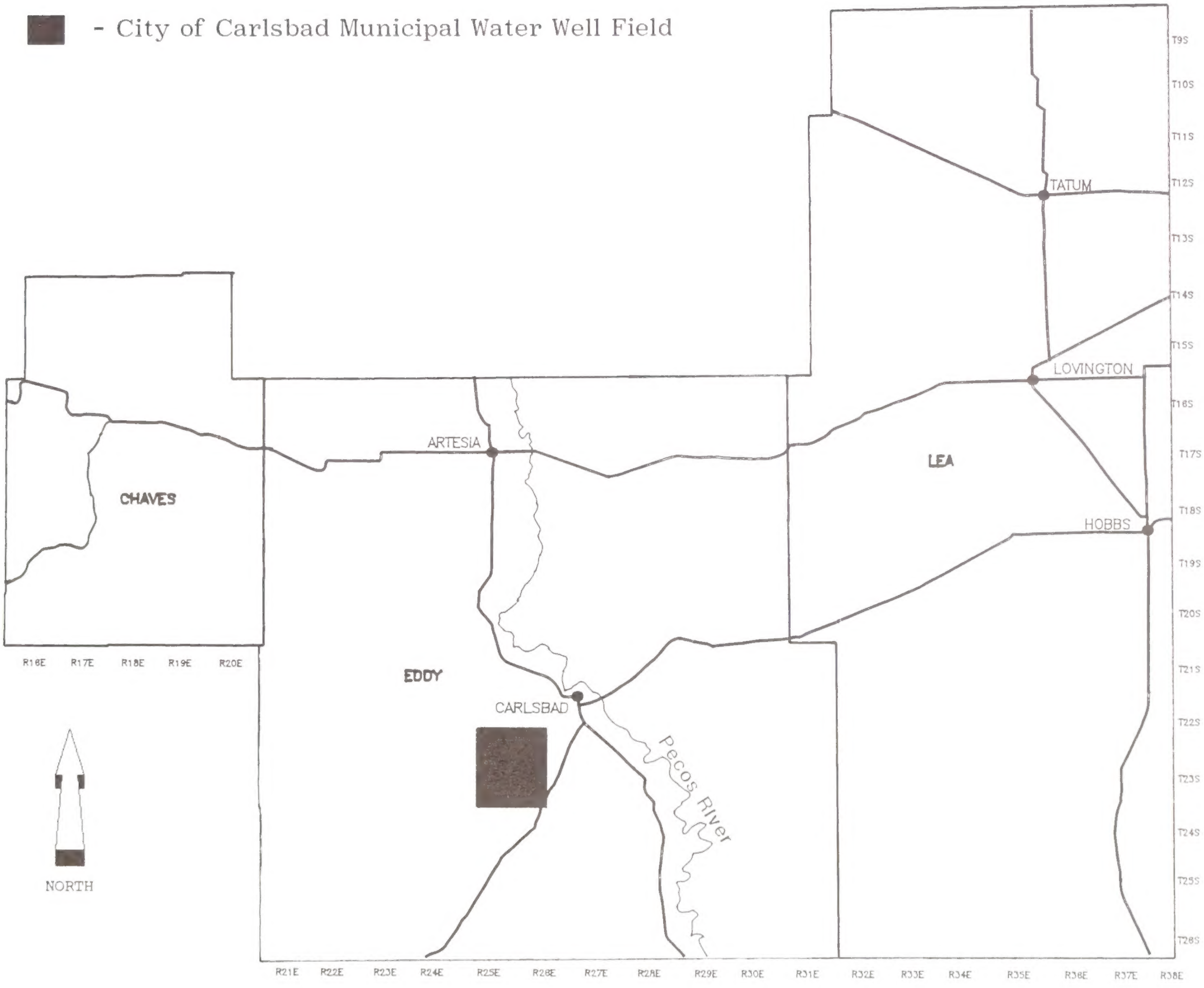
A controlled surface use restriction would be applied when needed as a condition of approval for APDs for oil or gas wells proposed in the City of Carlsbad's municipal water well field, or within 3 miles of the field (Map 6). If an APD is filed in that area, the BLM would consult with the City of Carlsbad to determine the appropriate action to take. Prohibitions on blasting during well-site construction and special casing requirements would be the restrictions most often applied. This controlled surface use restriction would apply to an area of about 26,800 acres of public surface and minerals, and about 2,720 acres of federal mineral estate under other surface ownerships.

Other Surface Management Agencies

In some cases, federal minerals in the Carlsbad Resource Area underlie lands managed by other agencies (known as "other surface management agencies"), see Map 7. The other surface management agencies in the Carlsbad Resource Area were asked to provide their oil and gas leasing recommendations and leasing stipulations. The leasing requirements are described below. The acreages listed refer to federal mineral estate.

Federal Aviation Administration

- Consult with FAA prior to approving occupancy at Air Base City (Hobbs Industrial Air Park) (160 acres); Carlsbad Airport (160 acres); Jal Airport (280 acres); Artesia Airport (200 acres)



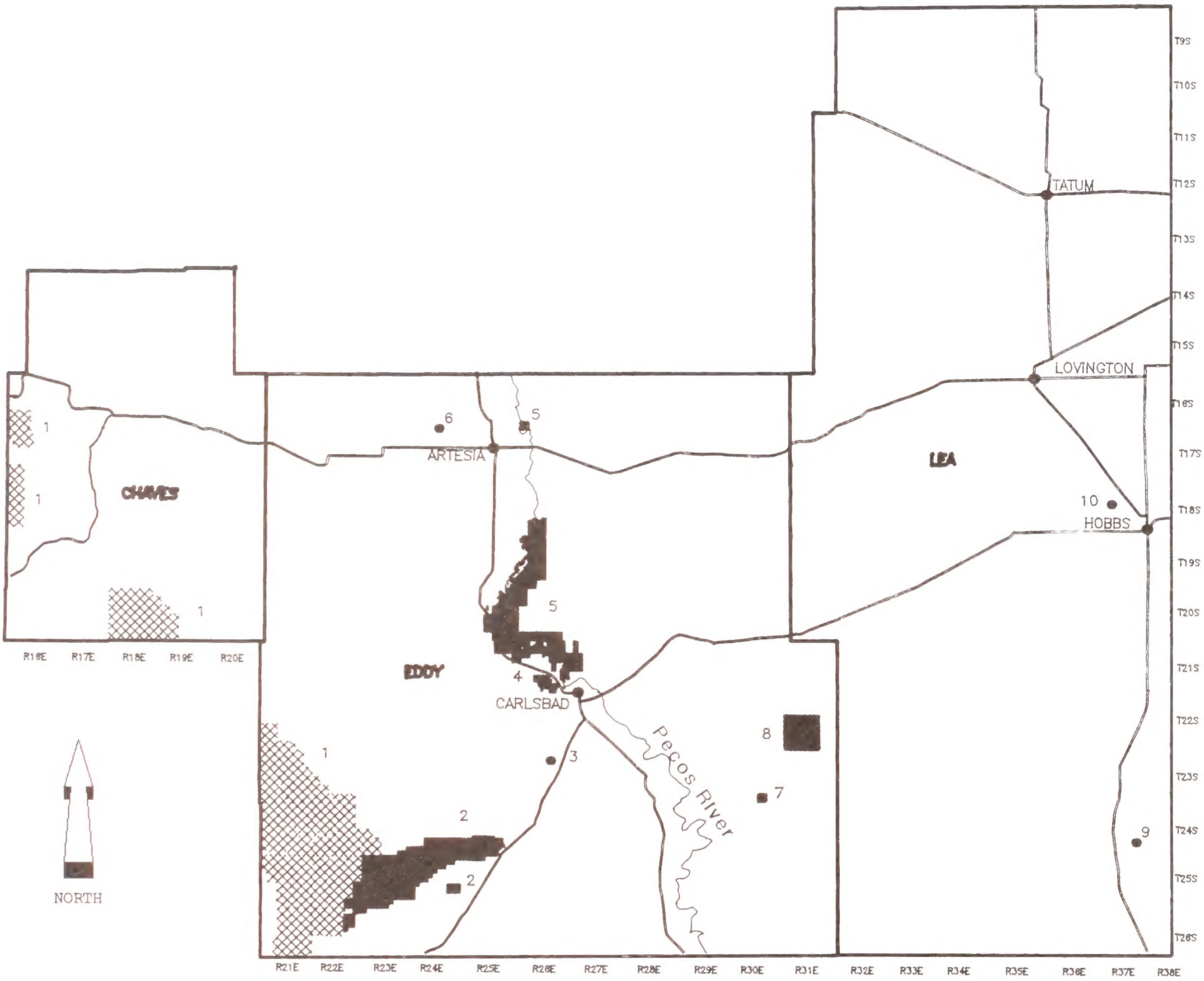
SCALE
1/2" = 9.5 Miles
BLM-Roswell District, 1994

MAP 6
CITY OF CARLSBAD MUNICIPAL WATER WELL FIELD
Carlsbad Resource Area

Surface Management By Other Agencies - Surface Stipulations for Federal Minerals by Alternative

	A	B	C	D	E
1 - Lincoln National Forest	X	X	X	X	X
2 - Carlsbad Caverns Nat'l Park	X	X	X	X	X
3 - Carlsbad Airport	X	X	X	X	X
4 - Living Desert State Park/ State Militia Site	X	X	X	X	X
5 - Bureau of Reclamation - Avalon and Brantley Reservoirs.	X	X	X	X	X
6 - Artesia Airport	X	X	X	X	X
7 - Dept. of Energy, Gnome Site	X	X	X	X	X
8 - Dept. of Energy, WIPP Site	Not Applicable				
9 - Jal Airport	X	X	X	X	X
10 - Hobbs Airport	X	X	X	X	X

NOTE - Reader must refer to the tables and narrative to determine the affected acreage within each area.



SCALE
1/2" = 9.5 Miles
BLM-Roswell District, 1994

MAP 7
SURFACE MANAGEMENT BY OTHER AGENCIES
Carlsbad Resource Area

Bureau of Reclamation

Brantley Reservoir (31,000 acres including the state park)

- No Surface Occupancy within the boundary of Brantley Lake State Park.
- No Surface Occupancy within one-half mile of Brantley Dam site. Drilling proposed within one-half to one mile of the Brantley Dam site would be considered on a case-by-case basis after review of the geology of the proposed drilling location. In no case would surface occupancy be allowed within one-half mile of the dam.
- Surface occupancy below natural elevation 3271' would be considered on a case-by-case basis.
- No storage facilities below elevation 3286' MSL.
- Areas not covered by the requirements mentioned above would be leased and managed under appropriate BLM Roswell District stipulations or conditions of approval (e.g., stipulations for floodplains).

Avalon Reservoir (14,800 acres)

- No Surface Occupancy within one-half mile of the Avalon Dam site.
- No Surface Occupancy below elevation 3190' MSL.
- No storage facilities below elevation 3200' MSL.
- Areas not covered by the requirements mentioned above would be leased and managed under appropriate BLM Roswell District stipulations or conditions of approval (e.g., stipulations for floodplains).

If lands presently managed by the BOR revert back to the management of the BLM, they would be leased with the above restrictions and managed under appropriate Roswell District Surface Use and Occupancy Requirements (Appendix 3) and Conditions of Approval (Appendix 4).

Department of Energy

- WIPP Site (10,245 acres), not open to leasing (Note: Although the WIPP Site remains closed to leasing, administration of the federal mineral and surface estates has been transferred from the BLM to the Department of Energy. The management of the WIPP Site will not be discussed further in this document.)
- Gnome Site (690 acres), not open to leasing

New Mexico State Parks

- Brantley Lake (10,000 acres), No Surface Occupancy (see "Bureau of Reclamation," above).
- (Note: Living Desert (1,120 acres) is discussed under the various alternatives.)

New Mexico State Militia

- Militia Site (720 acres), not open to leasing

U.S. Forest Service, Lincoln National Forest (175,345 acres)

- Not open to leasing, 26,282 acres
- Open to leasing, 149,063 acres. Acreage on which "no surface occupancy" would be applied has not been identified. Some acreage will have "controlled surface use." Restrictions on areas open to leasing will be determined on a case-by-case basis.

U.S. National Park Service

- Carlsbad Caverns National Park (46,530 acres), not open to leasing.

ROSWELL RESOURCE AREA

Lease notices would be used to alert lessees to potential special requirements on exploration, drilling or production. Lease notices covering the protection of potential cave or karst areas, and the protection of threatened or endangered, or sensitive, plant or animal species would remain in use.

Additional lease notices would be developed as needed.

Other Surface Management Agencies

In some cases, federal minerals in the Roswell Resource Area underlie lands managed by other agencies (known as "other surface management agencies"), see Map 8. The other surface management agencies in the Roswell Resource Area were asked to provide their oil and gas leasing recommendations and leasing stipulations. The leasing requirements are described below. The acreages listed refer to federal mineral estate.

Federal Aviation Administration

- Consult with FAA prior to approving occupancy at Santa Rosa Municipal Airport (320 acres)

Bureau of Reclamation

Fort Sumner Project (11,240 acres including the state park)

- No Surface Occupancy within one-half mile of the Fort Sumner Dam site.
- No Surface Occupancy within Sumner Lake State Park.
- No Surface Occupancy below elevation 4279' MSL.
- No storage facilities below elevation 4300' MSL.
- Areas not covered by the requirements mentioned above would be leased and managed under appropriate Roswell District stipulations or conditions of approval (e.g., stipulations for floodplains).

Tucumcari Project

- No Surface Occupancy within the boundary of Hudson Lake.
- No Surface Occupancy below within the boundary of Dry Lake, below elevation 4085' MSL.

If lands presently managed by the BOR revert back to the management of the BLM, they would be leased with the above restrictions and managed under appropriate Roswell District Surface Use and Occupancy Requirements (Appendix 3) and Conditions of Approval (Appendix 4).

Department of Defense

U.S. Air Force

- Melrose Bombing Range core area (6,714 acres), not open to leasing
- Melrose Bombing Range buffer area (1,000 acres), open to leasing with controlled surface use. No structures taller than 100 feet. Exceptions may be considered on a case-by-case basis by the Commander, Cannon AFB.

U.S. Army

- White Sands Missile Range (180,756 acres), not open to leasing

U.S. Army Corps of Engineers

- Two Rivers Reservoir Project (2,785 acres), open to leasing under appropriate Roswell District Surface Use and Occupancy Requirements (Appendix 3) and Conditions of Approval (Appendix 4), unless other management is requested by the Corps of Engineers.

New Mexico State Parks

- Sumner Lake (8,123 acres), no surface occupancy (see "Bureau of Reclamation," above).
- Ute Lake (325 acres), no surface occupancy
- (Note: Bottomless Lakes, 460 acres, is discussed under the various alternatives.)

U.S. Fish and Wildlife Service

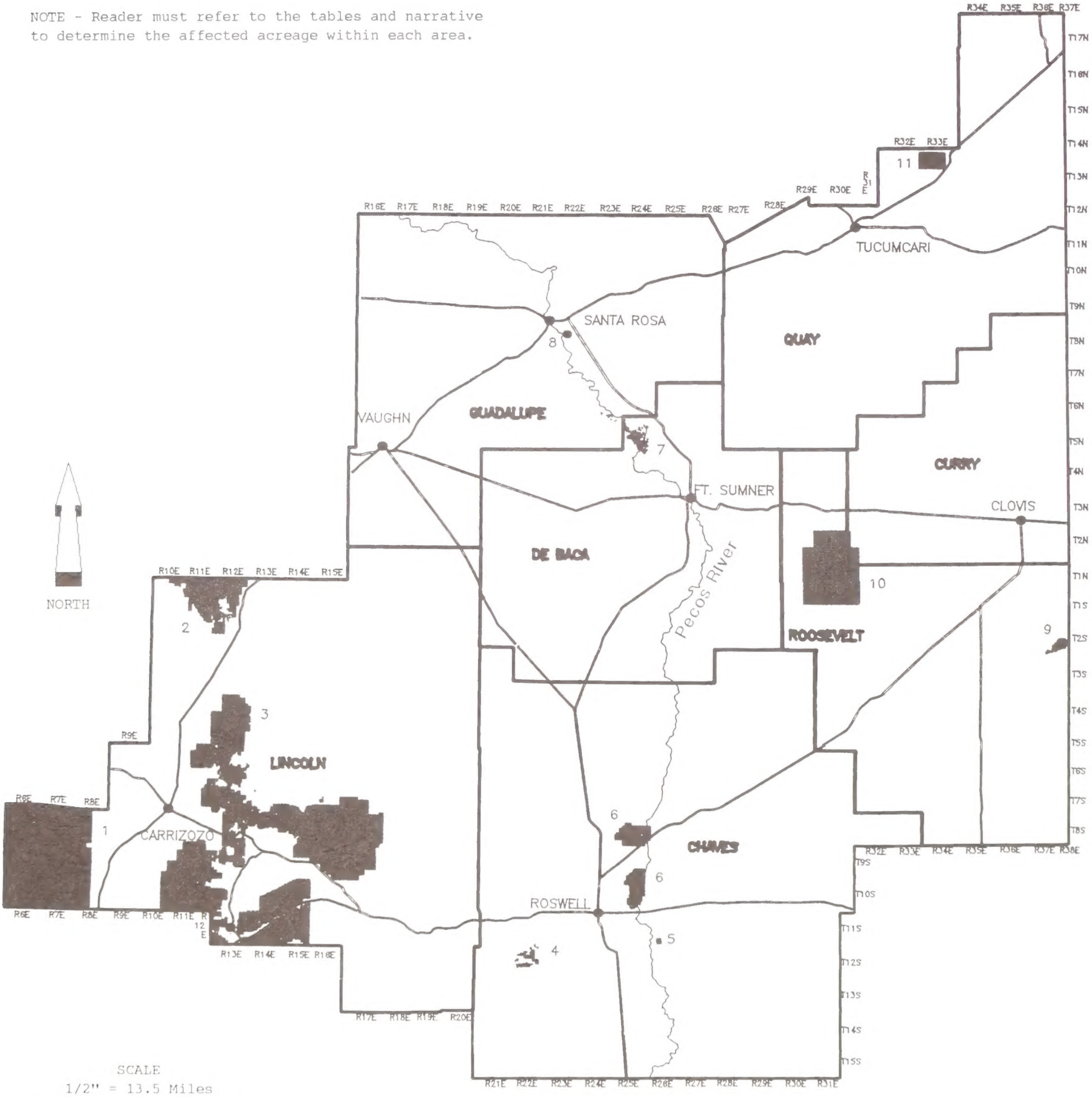
- Salt Creek Wilderness (1,240 acres), not open to leasing

Surface Management By Other Agencies -
Surface Stipulations for Federal Minerals by Alternative

	A	B	C	D	E
1 - White Sands Missile Range	X	X	X	X	X
2 - Cibola National Forest	X	X	X	X	X
3 - Lincoln National Forest	X	X	X	X	X
4 - Two Rivers Reservoir	X	X	X	X	X
5 - Bottomless Lakes State Park	X	X	X	X	X
6 - Bitter Lake Wildlife Refuge	X	X	X	X	X
7 - Sumner Lake	X	X	X	X	X

	A	B	C	D	E
8 - Santa Rosa Airport	X	X	X	X	X
9 - Grulla Wildlife Refuge	X	X	X	X	X
10 - Melrose Bombing Range	X	X	X	X	X
11 - Ute Lake State Park	X	X	X	X	X

NOTE - Reader must refer to the tables and narrative to determine the affected acreage within each area.



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 8
SURFACE MANAGEMENT BY OTHER AGENCIES
Roswell Resource Area

- Grulla National Wildlife Refuge (69 acres) not open to leasing

- (Note: Bitter Lake National Wildlife Refuge, 6,320 acres, is discussed under the various alternatives. The Salt Creek Wilderness is administered by the U.S. Fish and Wildlife Service as part of Bitter Lake National Wildlife Refuge, but the 1,240-acre wilderness is not included in the acreage shown for the refuge.)

U.S. Forest Service, Cibola National Forest (34,336 acres)

- Not open to leasing, 19,178 acres

- Open to leasing, 15,158 acres. Acreage on which "no surface occupancy" would be applied has not been specifically identified, but would apply to all developed recreation sites and electronic sites, and to slopes greater than 41 percent, unless a specific site is authorized. Some acreage will have "controlled surface use." Restrictions on areas open to leasing will be determined on a case-by-case basis.

U.S. Forest Service, Lincoln National Forest (364,579 acres)

- Not open to leasing, 99,171 acres

- Open to leasing, 265,408 acres. Acreage on which "no surface occupancy" would be applied has not been identified. Some acreage will have "controlled surface use." Restrictions on areas open to leasing will be determined on a case-by-case basis.

Locatable Minerals Management

Goal: Continue to keep lands available for development of locatable minerals, while maintaining important environmental values.

Lands currently withdrawn from entry under the 1872 Mining Law or closed to mineral leasing would remain unchanged unless otherwise designated by this plan (Table 5). The BLM would periodically review all land withdrawals to determine if restrictions continue to be necessary to protect affected resource values. At such time as a withdrawal is no longer considered to be necessary, it will be lifted and the lands returned to management under the general mining and mineral leasing laws.

TABLE 5

AREAS WITHDRAWN FROM MINERAL ENTRY ROSWELL RESOURCE AREA MANAGEMENT COMMON TO ALL ALTERNATIVES

Areas	**Estimated Mineral Acreage**
BLM MANAGEMENT:	
Fort Stanton	27,622
Mathers Research Natural Area	242
Mescalero Sands Recreation Complex	6,617
Torgac Cave National Natural Landmark	40
Subtotal	34,521
OTHER AGENCY MANAGEMENT:	
Blackwater Draw Archaeological Site	711
Canal Right-of-Way (NM 21834)	7
Melrose Bombing Range, core area	6,714
Nike Hercules Defense Site	325
NM Army National Guard Training Site	53
Fort Sumner Dam and Sumner Lake State Park (acreage combines three segments)	8,123
Two Rivers Reservoir Project	2,590
Tucumcari Project, Conchas Canal (NM 52398)	7
Subtotal	18,530
Total	53,051

Source: BLM files, 1994.

All BLM-administered lands would be open to mining claim location and development, except those lands closed to mining claim location by withdrawal. BLM-administered lands currently withdrawn from all forms of appropriation under the general mining laws are summarized in Appendix 6 and shown on Map 9.

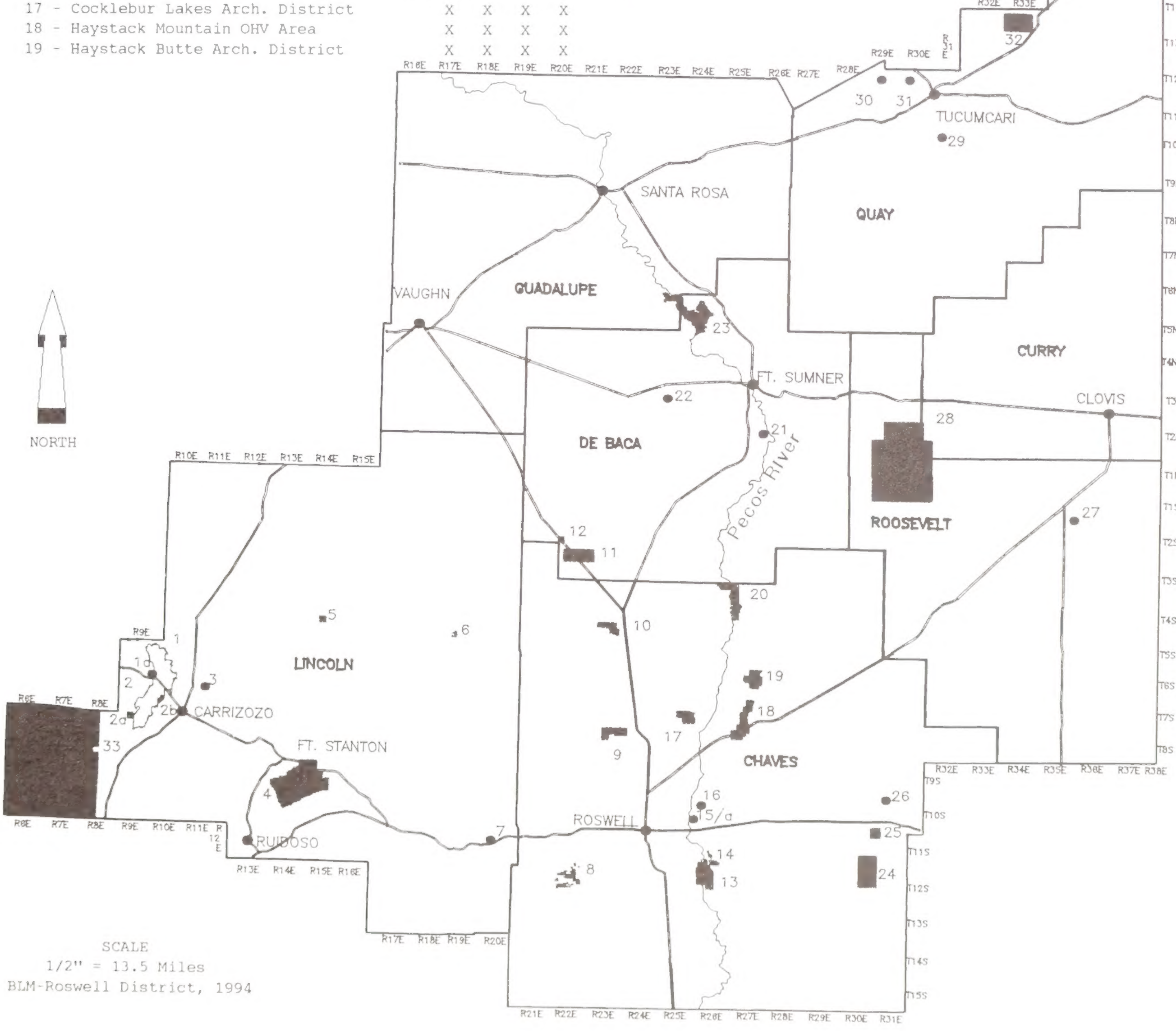
Areas Withdrawn, by Alternative

	A	B	C	D	E
1 - Little Black Peak WSA		X	X	X	X
1a - Millrace Cave*		X	X	X	X
2 - Carrizozo Lava Flow WSA		X	X	X	X
2a - Crockett Cave*		X	X	X	X
2b - Valley of Fires Recreation Area		X	X	X	X
3 - Water Power Site	X	X	X	X	X
4 - Fort Stanton*	X	X	X	X	X
5 - Zia Christine Cave*		X	X	X	X
6 - Border Hill NNL		X	X	X	X
7 - Torgac Cave*		X	X	X	X
8 - Two Rivers Reservoir Project	X	X	X	X	X
9 - Angora Cave*		X	X	X	X
10 - Martin-Antelope GYP Cave*		X	X	X	X
11 - Crystal Caverns/Devil's Den Caves*		X	X	X	X
12 - Coachwhip Cave*		X	X	X	X
13 - Overflow Wetlands*		X	X	X	X
14 - Bottomless Lakes State Park		X	X	X	X
14a - Garnsey Bison Kill Site		X	X	X	X
15 - Bat Hole Cave*		X	X	X	X
15a - Nike Defense Site	X	X	X	X	X
16 - Bitter Lake Wildlife Refuge/ Salt Creek Wilderness	Not Applicable				
17 - Cocklebur Lakes Arch. District		X	X	X	X
18 - Haystack Mountain OHV Area		X	X	X	X
19 - Haystack Butte Arch. District		X	X	X	X

	A	B	C	D	E
20 - North Pecos River*		X	X	X	X
21 - Billy the Kid Recreation Site			X	X	X
22 - FAA Navigation Site	X	X	X	X	X
23 - Sumner Lake	X	X	X	X	X
24 - Mescalero Sands*	X	X	X	X	X
25 - Mescalero Sands OHV Area	Not Applicable				
26 - Mathers RNA	X	X	X	X	X
27 - Blackwater Draw Arch. Site		X	X	X	X
28 - Melrose Bombing Range	X	X	X	X	X
29 - BOR Reservoir #2	Not Applicable				
30 - Tucumcari-Conchas Canal	X	X	X	X	X
31 - National Guard Training Site	X	X	X	X	X
32 - Ute Lake State Park	Not Applicable				
33 - White Sands Missile Range	X	X	X	X	X

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the affected acreage and type of withdrawal within each area.



NORTH
QUAY
GUADALUPE
CURRY
DE BACA
ROOSEVELT
LINCOLN
CHAVES
TUCUMCARI
SANTA ROSA
VAUGHN
FT. SUMNER
CLOVIS
CARRIZOZO
FT. STANTON
RUIDOSO
ROSWELL
Pecos River
1
1a
2
2a
2b
3
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5
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R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R29E R30E R31E
R32E R33E
R34E R35E R36E R37E
R10E R11E R12E R13E R14E R15E
R9E
R8E R7E R8E
R8E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 9
AREAS WITHDRAWN
Roswell Resource Area

Solid Leasable Minerals Management

All public lands would be open for the leasing of solid minerals, except those identified otherwise.

Salable Minerals Management

All lands would be open to mineral material disposals, except those identified otherwise. Pertinent sections of the Roswell District Conditions of Approval (Appendix 4) would be applied to mineral material disposals.

LANDS AND REALTY MANAGEMENT

Utility and Transportation System

Land use authorizations (rights-of-way, leases, permits) would be issued on a case-by-case basis. Pertinent sections of the Roswell District Conditions of Approval (Appendix 4) would be applied to land use authorizations. Whenever possible, facilities would be confined to existing alignments, minimizing width requirements and maximizing multiple occupancy. Rights-of-way avoidance locations would be identified with terms and conditions that may apply to rights-of-way within the resource area. Rights-of-way would be granted only after site-specific analysis and development of specific stipulations. Rights-of-way would also be issued in accordance with New Mexico BLM's Roads Policy. Agriculture leases would be considered only when the lease is compatible with or enhances the land's identified resource values.

Landfills, hazardous waste disposal sites, and produced water disposal pits would not be authorized under rights-of-way or R&PP leases. If BLM lands are needed for these purposes, a title transfer would be considered.

A utility corridor for ancillary facilities associated with the Sierra Blanca Regional Airport would be retained. The corridor dimensions are 100 feet on each side of Lincoln County Road B-006, and 1.5 miles in length.

Acquisitions

The BLM would pursue the acquisition of facilities at Fort Stanton formerly owned by New Mexico State University. The acquisition of state and private lands in wilderness study areas would be pursued if opportunities arise (refer to the "Wilderness Management" discussion in this section).

Access

Access to public lands would be provided throughout the planning area. Easements would be acquired to provide access to public lands for recreational, wildlife, range, cultural/historical, mineral, special management, and other resource needs. Priority for the acquisition of easements would be placed on former county roads vacated by county governments, when those roads are important for the management of the public lands. Access would be closed, or restricted, where necessary and in accordance with OHV designations, to protect public health and safety or areas with significant resource values.

Placement of advertising signs on public lands adjacent to county roads, or roads on the BLM Transportation Plan, would be required to meet the criteria for sign placement on federal or state highways.

Trespass

Unauthorized uses in the planning area would be resolved on a case-by-case basis. If circumstances warrant, the issuance of a permit, lease, or right-of-way authorizing the use could occur. Disposal of a parcel through sale or exchange may be considered to resolve long-standing trespass if disposal criteria are met.

Withdrawals and Classifications

Land withdrawals and classifications would be processed to afford protection to important resource values. Withdrawals that no longer serve the purposes for which they were originally intended would be revoked. Prior to revocation, withdrawn lands would be reviewed to determine if any other resource values require withdrawal protection. Existing withdrawals are shown on Map 9 and displayed in Appendix 6.

The Multiple Use Management Classification as it affects public lands in the planning area would be revoked. (Refer to Appendix 6.)

Public water reserves would be terminated where no longer needed, and acquired where the need exists.

Public lands identified as having water power values would be protected by a water power withdrawal. Water power withdrawals of public lands that lack water power values or are inconsistent with the objectives of the approved RMP would be reviewed and recommended for termination.

LIVESTOCK GRAZING MANAGEMENT

Allotment categorization and initial grazing use allocations made in the East Roswell Grazing Environmental Impact Statement (1979) and the Roswell Resource Area Management Framework Plan/Environmental Impact Statement (1984) would be used as the basis for continued livestock grazing. Changes in use allocations would continue to be made on the basis of monitoring data.

Forty-five existing allotment management plans (AMPs) are in various states of implementation or revision. Each year, some of the 45 would be revised or new AMPs on "I" category allotments would be started. However, the total number of both existing and new AMPs worked on each year would average about three. An interdisciplinary approach will be used in the development of AMPs to address other resource concerns, such as wildlife habitat within the Macho HMP or DPC objectives for a specific plant community.

Livestock grazing following vegetative treatments would be deferred for a time period established in conjunction with the treatment method. In areas where shinnery oak is no longer treated, reductions in livestock numbers, or other changes, would be considered, and implemented, if needed, to avoid conflicts with the management of habitat for the lesser prairie chicken and the dunes sagebrush lizard. Livestock grazing would also be deferred in areas burned by wildfires, if needed. The time periods for deferments would be determined on a case-by-case basis, after considering factors such as the extent of the fire, the type of vegetation burned, the intensity of the fire, and vegetation management objectives.

Within the Macho WHA, no new netwire fences would be allowed across public lands on allotments that currently support antelope or on allotments in the WHA with the potential to provide suitable antelope habitat. Exceptions to this requirement are:

- The grazing permittee agrees to the construction of antelope passes on proposed interior fences;
- The grazing permittee agrees to allow the BLM to modify fences;

- Netwire would be used in the construction of small traps or holding pens;

- Netwire would be used in security fences around facilities such as microwave sites.

Pertinent sections of the Roswell District Conditions of Approval (Appendix 4) would be applied to approvals for construction of range improvement projects.

VEGETATION MANAGEMENT

Native, deciduous tree species in all plant communities, such as hackberry, black walnut, New Mexico walnut, and desert willow, would be protected from vegetation treatments and surface disturbance.

PEST MANAGEMENT

Noxious Weeds

Treatment of noxious weed species identified by the state would be coordinated and conducted with county governments. Treatments of noxious weeds on public lands would be designed to control infestations using an integrated pest management approach, based on predicted economic, ecological, and sociological effects. Chemical, mechanical, and biological methods of control would be considered. The design of projects, application of treatments, and monitoring of effects would be in accordance with the BLM's Environmental Impact Statement on Vegetation Treatment on BLM Lands and the Record of Decision for New Mexico.

Insects

Treatment of insect infestations would be coordinated with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine, pursuant to the Memorandum of Understanding between

USDA and USDI for management of grasshoppers and Mormon crickets. Integrated pest management would be employed to control infestations, based on predicted economic, ecological and sociological effects. Chemical, mechanical, and biological methods of control would be considered.

CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT

Cultural Resources

Cultural inventory surveys would continue to be required for federal actions involving surface disturbing activities except where criteria to exempt surveys are met. These criteria are:

- Previous ground disturbance has modified the surface greatly.
- Human activity within the last 50 years has created a new land surface.
- Existing Class 2 (sample survey) or equivalent inventory data are sufficient to indicate that the environmental situation did not support human occupation.
- Availability of Class 3 {intensive survey} information of the area has been fully documented.
- Presence of a geomorphic situation that does not enhance preservation.
- A large number of negative surveys in close proximity to each other.
- Absence of criteria listed in "criteria for survey".

Eligible and potentially eligible sites would continue to be protected from damage or archaeologically treated to mitigate damage. Rarely would buffer areas beyond 50 feet be established to protect cultural resources.

Paleontological Resources

A Class I literature survey would be conducted and existing inventory records would be examined to determine the potential for paleontological resources. These resources would then be addressed in the BLM's planning and environmental analysis processes.

Where potential impacts exist from proposed surface disturbing activities, the following procedures would be considered for mitigation of impacts:

- If potential is unknown, a Class II (sample survey) could be conducted to determine the presence of paleontological resources.
- If paleontological resources are present, a Class III inventory and assessment could be conducted to determine the potential for scientific of educational value.

Paleontological resources considered to be of scientific interest would be addressed in activity plans to ensure adequate protection.

Management of paleontological resources would include making them available for uses such as scientific collection and research, educational and interpretive activities, and recreation.

The BLM would promote consistency among federal agencies having paleontological resource management responsibilities, and facilitate the exchange of information between federal, state, and local governments and scientific organizations concerned with the management, study, and protection of these resources.

The BLM would continue to afford the protection provided under law to fossils of scientific interest and work to increase the awareness of federal land managers and the public regarding paleontological resource management.

OUTDOOR RECREATION MANAGEMENT

Goal: The public lands in the Roswell Resource Area would be managed to ensure the continued availability of quality outdoor recreation opportunities and experiences that are not readily available from other sources. Recreation use as well as capital investments in facilities are managed to protect the health and safety of visitors; to protect natural, cultural and other resources; to encourage public enjoyment of public lands; and to resolve use conflicts.

Recreation Management

Permits for commercial hunting outfitting and guiding operations would be issued resource area-wide. Special Recreation Use Permits (SRUPs) would be issued for other organized and commercial activities in accordance with Bureau of Land Management (BLM) guidelines and policies. Pertinent sections of the Roswell District Conditions of Approval (Appendix 4) would be applied to approvals for SRUPs.

The rules of conduct listed in Appendix 7 would be applied to all public lands in the Roswell Resource Area.

The Rio Bonito acquired lands would be closed to the use of weapons to ensure the safety of recreationists using those lands and the residents living adjacent to them.

The Valley of Fires Recreation Area would continue to be managed for intensive use with emphasis on maintaining and upgrading the existing facilities. The planned development includes a visitor center, shower facilities, trail development, and campground expansion.

The BLM will identify recreational and interpretive opportunities in the Roswell Resource Area for future development and implementation in accordance with national and state goals, policies and guidelines.

Interpretation

The primary objective in the Roswell Resource Area's interpretive program would be to assist visitors in developing a keener awareness, appreciation and understanding of the areas they visit. The second objective would be to encourage thoughtful use of the natural resources available in the resource area to reduce impacts on natural resources. The final objective would be to promote a public understanding of BLM goals and objectives.

The main emphasis for interpretation would be placed on the Valley of Fires Recreation Area, Mescalero Sands North Dunes OHV Area, Fort Stanton and the caves in the resource area (see Table 6). Emphasis would also be placed on off-site interpretive programs.

Tools used to accomplish these objectives may include: interpretive trails, exhibits, literature, waysides, environmental education, special populations programs, visitor/information stations, auto-tours, campfire talks and guided walks and the use of volunteers as docents.

TABLE 6
RESOURCE INTERPRETATION OPPORTUNITIES
ROSWELL RESOURCE AREA -- MANAGEMENT COMMON TO ALL ALTERNATIVES

Special Management Area	Proposed Interpretive Themes
Billy The Kid Recreation Site	Wise Use of Public Lands
Border Hills National Natural Landmark	The Making of a Mountain
Dunahoo Hills OHV Area	Multiple Use Management of Public Lands
Fort Stanton	Historic and Prehistoric Settlements
Garnsey Bison Kill Site	Plains Indians Subsistence: Prairie, River and Mountain
Haystack Mountain OHV Area	Sandstone and All-Terrain Vehicles
Mathers RNA	Benefits of the Shinnery Oak Community
Mescalero Sands	Drifting sands, endemic plants and wildlife
Mescalero Sands North Dune OHV Area	Tread Lightly and Safely
Non-specific Use Areas	Land Use Ethics and Minimum Impact Use
Rio Bonito	Life in the Bonito Valley
Roswell Caves	Cave Ecosystems and Hazards
Valley of Fires Recreation Area	Fire, Thunder and Smoke in the Tularosa Basin

Cave and Karst Resource Management

Commercially-guided cave trips would continue to be allowed in Roswell Resource Area caves on a case-by-case basis. No more than 20 percent of total cave use in the resource area would be allotted to commercial use.

Big-Eared Cave, Malpais Madness, Corn Sink Hole, and Tres Ninos caves would be closed to visitor use annually from November 1 to April 15 to protect significant bat hibernacula. Seasons of use and visitor use restrictions would be applied to any other caves or portions of caves found to have significant bat hibernacula or nurseries.

Depositing human waste, including spitting, would not be allowed in any of the resource area's caves. Each cave user would be responsible for disposing of human waste in an approved receptacle. Smoking would be prohibited in all significant caves in the resource area.

Visual Resource Management

Goal: Manage public lands to protect and maintain the quality of the scenic (visual) values of these lands.

Visual resources generally would be managed to meet the Visual Resource Management (VRM) classes. All proposed management activities would be evaluated with regard to visual resource management and those projects that are compatible with the character of the natural landscape would be encouraged. No management actions are proposed that would improve or degrade visual quality to the extent that a change in any VRM class would result. Existing VRM classes are discussed in Chapter 3 and in the Glossary. The management of visual quality in special resource management areas is summarized in Table 7.

Recreation Opportunity Management

Goal: Manage public lands to protect and maintain recreation opportunity.

Recreation opportunity would be managed so that opportunities categorized by the Recreation Opportunity System (ROS) would be maintained. No management actions are proposed that would improve or degrade recreation opportunity to the extent that a change in any ROS category would result. Existing ROS classes are discussed in Chapter 3 (see Table 99) and in the Glossary. The management of recreation opportunity in special resource management areas is summarized in Table 7.

Off-Highway Vehicle Use Management

Goal: Manage OHV use to provide adequate access and reduce adverse impacts on sensitive resource values.

The closed to off-highway vehicle use designation on the Comanche Hill area "A" (660 acres) and area "C" (240 acres) would be retained, to help protect the scenic views from U.S. Highway 380, and to prevent waterfowl disturbance at the Bitter Lake National Wildlife Refuge.

The Haystack Mountain and Mescalero Sands North Dune OHV areas would continue to be managed for intensive OHV use, with emphasis on providing a high quality, safe play area.

On public lands where OHV use is limited or closed, waivers of restrictions would be considered on a case-by-case basis for activities such as maintenance of permitted range improvements, geophysical exploration, pipeline construction or maintenance, or oil and gas operations. Any waiver must be considered and approved by the authorized officer in advance of the proposed use.

Wilderness Management

Goal: Manage the Wilderness Study Areas (WSAs) in a manner that leaves the wilderness characteristics such as naturalness, outstanding opportunities for solitude and primitive or unconfined types of recreation unimpaired for future use and enjoyment.

The two Wilderness Study Areas, which total 25,312 acres, would continue to be managed under the Interim Management Policy and Guidelines for Land Under Wilderness Review until the areas are added to the National Wilderness Preservation System or removed from further wilderness consideration. If designated as wilderness, the areas would be managed under the Wilderness Management Policy.

TABLE 7
SUMMARY OF VRM AND ROS ACREAGES IN SPECIAL RESOURCE MANAGEMENT AREAS, BY ALTERNATIVE
ROSWELL RESOURCE AREA

SPECIAL RESOURCE MANAGEMENT AREA	VRM[1] CLASS	ROS[1] CLASS	ACRES IN CLASS, BY ALTERNATIVE				
			A	B	C	D	E
Mescalero Sands North Dune OHV	II & I	R	610	610	1,546[3]	1,546[3]	1,500
Mescalero ACEC Area	I	RN-R	NA	7,888	7,888	7,888	7,886
Mescalero ONA	I	RN-R	6,173	NA	NA	NA	NA
Mescalero Recreation Complex	II & IV	RN-R	22,541	NA	NA	NA	NA
Mathers RNA	I	RN-R	241	241	241	241	241
Fort Stanton ACEC	II & III	RN-R	24,630	24,630	24,630	24,630	24,630
Overflow Wetlands ACEC	II	RN-R	2,987	2,987	2,987	2,987	2,987
Haystack Mountain OHV	III	RN-R	3,500	3,500	6,826[3]	6,826[3]	3,500
Valley of Fires Recreation Area	I & III	SPN-R	463	1,074[2]	463	1,074[2]	1,074[2]
Little Black Peak WSA	I	RN-R	15,072	15,072	15,072	15,072	15,072
Carrizozo Lava Flow WSA	I	SPN-RN-R	10,240	10,240	10,240	10,240	20,240
Billy the Kid Recreation Site	IV	UNCLASS.	NA	NA	80	80	80
Rio Bonito	III	RN	500	2,000	2,000	2,000	2,000
North Pecos River ACEC	IV	RN-R	NA	3,360[2]	3,360[2]	3,360[2]	3,360[3]
Garnsey Bison Kill Site	I	R	NA	360	120	360	360
Cocklebur Lakes AD	IV	RN-R	NA	3,000	3,000	3,000	3,000
Haystack Butte AD	III	RN-R	NA	3,400	3,400	3,400	3,400
Roswell Cave Complex ACEC							
Angora-Corn	IV	RN-R	NA	4,800	4,800	4,800	4,800
Bat Hole	II	R	1	40	40	40	40
Coachwhip	III	R	NA	614	614	614	614
Crockett	I	SPN-R	10	640	640	640	640
Crystal	I & IV	R	NA	2,280	2,280	2,280	2,280
Martin	IV	RN-R	NA	2,080	2,080	2,080	2,080
Millrace	I	SPN-R	NA	480	480	480	480
Torgac	IV	R	220	480	480	480	480
Zia	IV	R-RN	NA	480	480	480	480
Border Hill NNL	III	R	150	150	150	150	150
Dunahoo Hills	III	R-RN	NA	NA	640	640	640
North Pecos River ACEC	III	R-RN	NA	3,360	3,360	3,360	3,360
Total			87,338	93,766	97,897	98,748	105,374

[1] Refer to Glossary for definition of VRM and ROS Management Classes.

[2] BLM, Private and State Surface Ownership.

[3] BLM and Private Surface Ownerships.

Source: BLM files, 1994.

As opportunities arise, the BLM would pursue the acquisition of about 10,000 acres of state and private lands in and adjacent to the WSAs, to enhance manageability and to provide unimpaired access.

The Little Black Peak and Carrizozo Lava Flow WSAs would be closed to oil and gas leasing.

Wild and Scenic Rivers Management

There are no stream or river segments in the resource area recommended for nomination for inclusion in the National Wild and Scenic River System (refer to Appendix 2).

WATERSHED MANAGEMENT

During periods of drought or other emergencies, adjustments in livestock numbers would be made to guard against damage to the vegetal-soil resource.

Where soils and nontarget vegetation are disturbed, reclamation measures would be taken. These measures could include returning the land to as near its natural form as possible and reseeding with mixtures of grasses and forbs to prevent erosion.

If any new roads or trails are proposed, they would be constructed only if existing roads and trails cannot be used, and then only after a site-specific environmental assessment has been prepared.

AIR RESOURCE MANAGEMENT

The management of public lands would emphasize the maintenance of the Class II air quality in the Resource Area. Mitigations would be developed on a case-by-case basis to reduce or eliminate the effects of BLM-approved surface disturbing activities on air quality. Likewise, BLM-initiated activities, such as prescribed fires, would be designed to have minimal effect on air quality and to retain the Class II air quality standard.

WILDLIFE HABITAT MANAGEMENT

Special Status Species Habitat Management

The shortgrass aspect, which corresponds to the Grasslands community type, would be maintained for special status species which require this habitat type, including the mountain plover and Baird's sparrow. Control of mesquite, cholla, snakeweed, creosote would be employed as a means of maintaining the habitat.

Big Game/Upland Game Habitat Management

Big game habitat expansion and movement would be enhanced as opportunities arise by undertaking one or more of the following practices:

- Replacing existing netwire fences with barbed wire fences to facilitate the movement of wildlife between pastures;
- Installing antelope passes in netwire fences;
- Removing netwire fences on allotments converted from sheep to cattle;
- Lowering fences that exceed 42 inches in height;
- Removing extra strands of barbed wire to meet BLM standard 4-strand fence specifications;
- Removing extra top strands of barbed wire from netwire fences to prevent entanglement of mule deer;
- Considering terrain, forb and browse diversity, and pasture size and shape, when developing or redesigning pasture configurations;
- Disallowing the installation, or replacing, netwire fences along highway rights-of-way crossing public lands if not required for ranching operations;
- Acquiring privately owned fences built across public lands.

Existing habitat management plans would be revised, as needed, to incorporate changes resulting from decisions made in this RMP. Actions in existing habitat management plans would continue to be implemented.

Wildlife habitat developments and other management practices would be considered for use in improving mule deer habitat in the BLM's Mescalero Sands, Pecos River, Southwest Roswell, Cedar Hills, Fort Stanton, and Carrizozo mule deer management areas. Developments and practices include, but are not limited to:

- Construction of water developments for wildlife and livestock;
- Use of prescribed fire;
- Fuelwood sales;
- Fence modifications and exclosures;
- Aerial surveys of habitat and deer populations;
- Use of exclusion areas or buffer zones in brush control projects; and
- Modification of grazing systems.

FIRE MANAGEMENT

The construction of fire line with heavy equipment (e.g., bulldozers or graders) would be employed only:

- In exceptional cases (such as in salt cedar or in previously disturbed areas);
- With the approval of the Area Manager; and
- With the appropriate resource advisor(s) on the scene.

Management of areas burned by wildfires would be determined on a case-by-case basis, including the need for rehabilitation, for deferment of livestock grazing, and for other actions, such as emergency OHV closures. Considerations affecting management of burned areas include size and intensity of fire, type of vegetation burned, vegetation management objectives, and the management and use of the area prior to being burned.

HAZARDOUS MATERIALS MANAGEMENT

For BLM-authorized activities that involve hazardous materials or their use, precautionary measures would be used to guard against releases or spills into the environment. The transportation storage, and handling of hazardous materials would be conducted in accordance with manufacturers' specifications and applicable laws, such as the Resource Conservation and Recovery Act and the Emergency Planning and Community Right-To-Know Act.

The sale or transfer of public lands on which storage or disposal of hazardous substances has been known to occur would require public notification of the type and quantity of such substances.

Bureau of Land Management-administered public land sites contaminated with hazardous wastes would be reported, secured, cleaned up, or otherwise remedied according to applicable federal and state regulations and contingency plans. Parties responsible for contamination would be liable for cleanup and resource damage costs, as prescribed in federal and state regulations. If at all possible, the responsible parties would bear the financial burden of cleanup and resource damage costs.

If hazards are identified on BLM-administered public lands, the BLM would provide appropriate warnings and establish precautions for safety hazards associated with the use of those lands.

The BLM would conduct its own activities in a manner that reduces the amount or toxicity of waste generated from those activities.

SPECIAL MANAGEMENT AREAS (AREAS OF CRITICAL ENVIRONMENTAL CONCERN)

Fort Stanton Area (ACEC)

Management of the Feather Cave National Register site would emphasize off-site interpretation of its religious significance while allowing for the protection of fragile cultural values. The site would be managed in conjunction with the recreation management program, which proposes to close the cave to recreational use.

Lower Stanton Pueblo Ruin is an architectural site located very close to Feather Cave. Currently, this site is being used by Eastern New Mexico University as an archeology field school. An interpretive site at Lower Stanton Pueblo Ruin would be developed and managed in conjunction with the recreation management program to interpret Feather Cave and other cultural resources in the area. Development would occur after sufficient data recovery has been completed.

Fort Stanton Cave would be closed annually to recreation use from November 1 to the following April 15, to protect hibernating bat populations.

Feather Cave would be closed to all visitor use, except for administrative or research purposes, to protect the significant bat hibernacula and to protect visitors from extreme safety hazards associated with breakdown, vertical entrances and histoplasmosis. Recreation developments at Fort Stanton, including trails and camping areas, would continue to be maintained or upgraded, when needed, to meet requirements for visitor health and safety.

Roswell Cave Complex Area (ACEC)

Crockett, Crystal Caverns, Martin-Antelope GYP, Torgac Annex, and Torgac caves would be closed to visitor use annually from November 1 to April 15 to protect significant bat hibernacula. Seasons of use and visitor use restrictions would be applied to any other caves or portions of caves found to have significant bat hibernacula or nurseries.

Cavers begin a trip into Fort Stanton Cave.

ALTERNATIVE A

Alternative A is the continuation of current management and the "no action alternative," where the existing land management and uses of public lands and resources would continue at their present levels. For the Carlsbad Resource Area, management would be directed by the Carlsbad RMP. For the Roswell Resource Area, management would be based on existing guidance, including the Roswell District Oil and Gas Environmental Assessment.

In this alternative, management proposed for the Carlsbad Resource Area is found only in the Fluid Minerals section under the Minerals Management heading and in appendixes referenced in that section. All other proposed management in this alternative is for the Roswell Resource Area. The term "resource area" applies to the Roswell Resource Area.

MINERALS MANAGEMENT

Fluid Minerals

The No Action Alternative describes the continued implementation of established land use plans, policy and decisions for resource programs. Management of oil and gas resources would continue as specified in the existing Roswell District Oil and Gas Environmental Analysis (EA) and the Carlsbad Resource Area Resource Management Plan (RMP). Development of existing leases would continue in accordance with terms and conditions of the lease. New leases would continue to be issued under this alternative in accordance with the decisions in the existing Oil and Gas EA and RMP.

ROSWELL DISTRICT

The BLM administers approximately 13,835,000 acres of federal oil and gas mineral estate in the Roswell District. Under this alternative:

Approximately 12,008,941 acres (87 percent of the oil and gas mineral estate) would be open to leasing and development under the BLM's standard terms and conditions.

Approximately 1,258,288 acres (9 percent) would be open to leasing with timing or controlled surface use restrictions, which would be applied as stipulations to new leases or as conditions of approval to actions on existing leases, when needed following NEPA analysis.

Approximately 117,962 acres (1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued.

Approximately 449,809 acres (3 percent) would be closed to leasing. In these areas, existing leases would continue to be developed on a case-by-case basis. However, once leases terminate, they would not be re-offered for leasing.

Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in lesser prairie chicken habitat (Maps 10 and 11) during the period of April 1 to May 31, each year. During that period, other activities, including the operation and maintenance of oil and gas facilities, would not be allowed between 3:00 a.m. and 9:00 a.m. Normal vehicle use on existing roads would not be restricted. Exceptions to these restrictions would be considered for areas where there is no prairie chicken activity, as determined at the time of permitting. New leases issued in areas with prairie chicken habitat would have these restrictions attached. This timing restriction would be applied in prairie chicken areas as determined necessary at the time of permitting, even if the lease did not specifically contain the restriction.

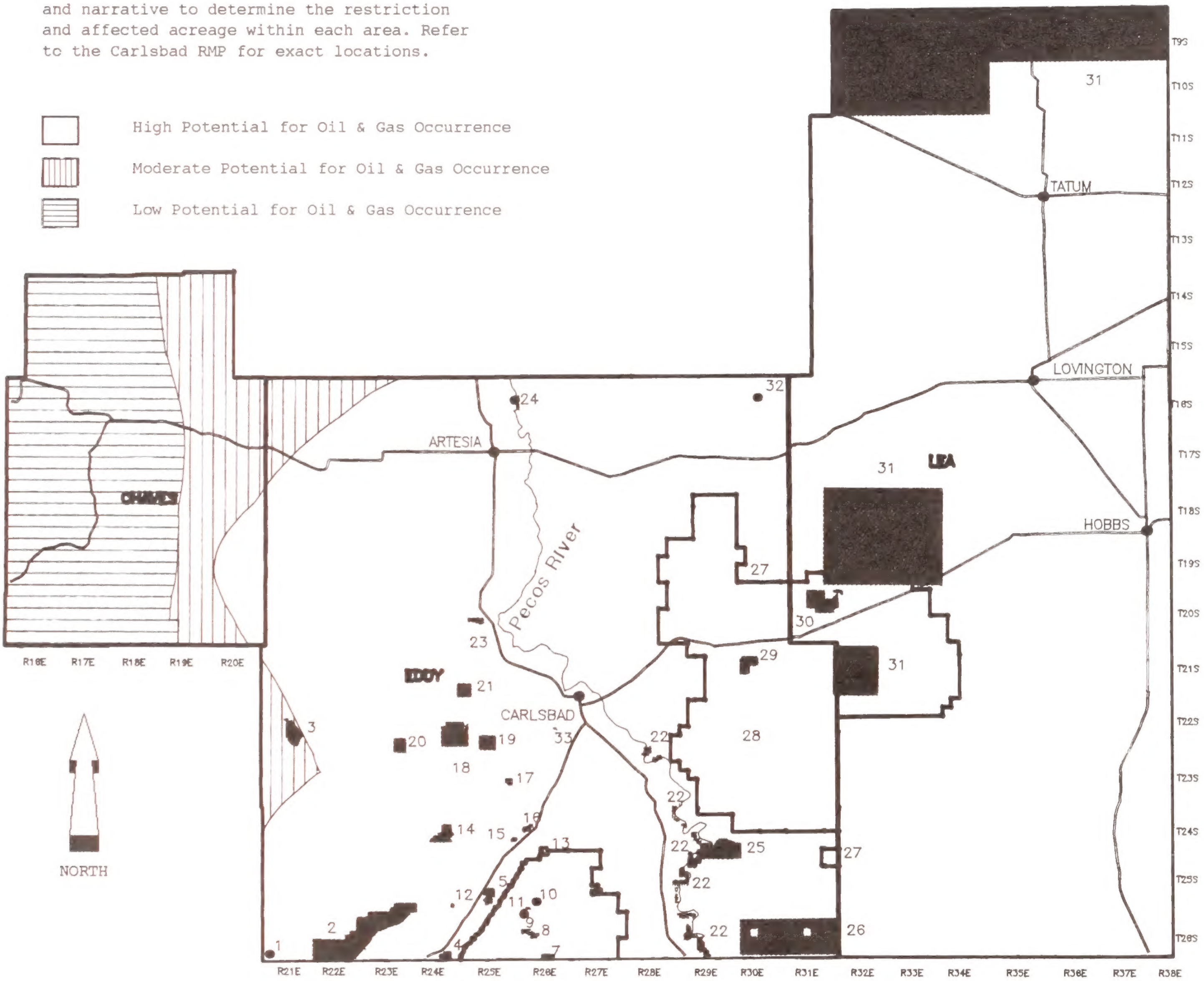
Oil and gas surface use or occupancy would be restricted in certain areas, as provided by regulations. On a case-by-case basis, when deemed appropriate as part of NEPA analysis and coordination with applicants and operators, new surface disturbance may be prohibited within 200 meters of the following areas, to protect natural resource values:

- wildlife habitat projects
- raptor nests
- fragile soils
- steep slopes
- perennial streams and rivers

Areas Stipulated, by Alternative

	A
1 - McKittrick/Devil's Den WSAs	X
2 - Guadalupe Scenic Area/ Lonesome Ridge ACEC, WSA	X
3 - East Guadalupe HMA/ South Texas Hill RNA	X
4 - Yeso Hills	X
5 - Chosa Draw ACEC	X
6 - Southern Gypsum Soil Area	X
7 - Owl Spring	X
8 - CP Hill Buckwheat Area	
9 - Ben Slaughter Draw	X
10 - Preservation Spring	X
11 - Cottonwood Spring	X
12 - Black River Buckwheat Area	n/a
13 - Blue Spring	X
14 - Mudgett's WSA/Dark Canyon EIS Area	X
15 - KFF Caverns	X
16 - Fence Canyon Caves	X
17 - Yellow Jacket/Lair Caves	X
18 - McKittrick Hill Caves	X
19 - Honest Injun Cave	X
20 - Bogle Spring	X
21 - Little Walt Canyon	X
22 - Pecos River Corridor	X
23 - Seven Rivers Hills HMA	X
24 - Blunt Nose Shiner WHA	X
25 - Pecos River Canyons Complex ACEC	X
26 - Phantom Banks Heronries/Pope's Well	X
27 - Potash Area	X
28 - Tamarisk Flat Heronries	X
29 - Maroon Cliffs Arch. District	X
30 - Laguna Plata Arch. District	X
31 - Prairie Chicken Habitat	X
32 - Poco Site	X
33 - Lost Cave	X

NOTE - reader must refer to the tables and narrative to determine the restriction and affected acreage within each area. Refer to the Carlsbad RMP for exact locations.



SCALE
1/2" = 9.5 Miles
BLM; Roswell District - 1994

MAP 10

OIL and GAS LEASING STIPULATION AREAS, ALTERNATIVE A

Carlsbad Resource Area

Areas Stipulated, by Alternative

No.	Area	A	B	C	D	E
1 -	Little Black Peak WSA	X	X	X	X	X
1a -	Millrace Cave*		X	X	X	X
2 -	Carrizozo Lava Flow WSA	X	X	X	X	X
2a -	Crockett Cave*		X	X	X	X
2b -	Valley of Fires Recreation Area		X	X	X	X
3 -	Fort Stanton*	X	X	X	X	X
4 -	Rio Bonito Acquired Lands	Not Applicable				
5 -	Zia Christine Cave*		X	X	X	X
6 -	Alleged UFO Crash Sites		X	X	X	X
7 -	Border Hill NNL		X	X	X	X
8 -	Torgac Cave*	X	X	X	X	X
9 -	Angora-Corn Cave*		X	X	X	X
10 -	Martin-Antelope GYP Cave*		X	X	X	X
11 -	Crystal Caverns-Devil's Well Caves*		X	X	X	X
12 -	Coachwhip Cave*		X	X	X	X
13 -	Overflow Wetlands*	X	X	X	X	X
14 -	Garnsey Bison Kill Site		X	X	X	X
15 -	Bat Hole Cave*		X	X		X
15a-	Comanche Hill	Not Applicable				
16 -	Cocklebur Lakes Arch. District		X	X	X	X
17 -	Haystack Mountain OHV Area	X	X	X	X	
18 -	Haystack Butte Arch. District		X	X	X	X
19 -	North Pecos River*		X	X	X	X
20 -	Billy the Kid Recreation Site		X	X		X
21 -	Mescalero Sands OHV Area		X	X	X	X
22 -	Mescalero Sands*	X	X	X	X	X
23 -	Mathers RNA	X	X	X	X	X

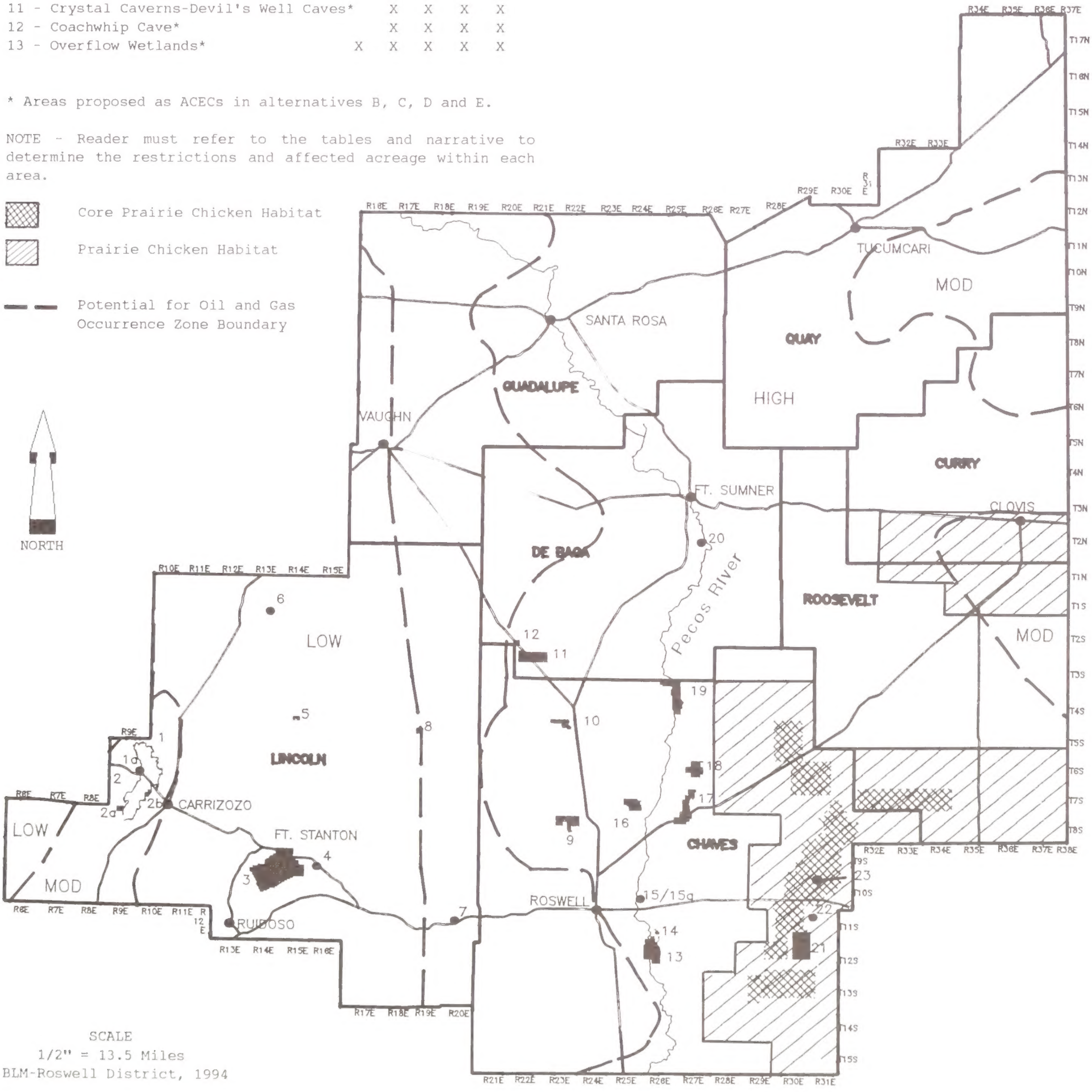
* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the restrictions and affected acreage within each area.

▩ Core Prairie Chicken Habitat

▨ Prairie Chicken Habitat

— — Potential for Oil and Gas Occurrence Zone Boundary



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 11
OIL and GAS LEASING STIPULATION AREAS
Roswell Resource Area

- floodplains
- playas and alkali lakes
- springs and seeps

On some oil and gas leases issued in cave or karst areas prior to 1991, drilling operations are prohibited within 300 feet of any known cave entrance, passage or significant karst feature or aspect. No pits associated with production facilities are allowed within 600 feet of such features. Since 1991, a notice has been applied to leases, to inform the lessee of the probability of special requirements for exploration, drilling and production. On a case-by-case basis, new surface disturbance would be prohibited within 200 meters of cave or karst features. The Practices for Oil and Gas Drilling Operations in Cave and Karst Areas (Appendix 5) for this alternative would be applied, as well.

Produced water disposal pits on public land in the Carlsbad Resource Area would not be allowed west of the Pecos River within the Capitan Reef and Back-Reef areas, and within 100-year floodplains, or near drainages, playas, water wells, or springs throughout the rest of the district. In all other areas in the Roswell District, disposal of produced water in lined pits would be permitted on public lands.

Reclamation of surface disturbance would be conducted according to standard operating procedures (conditions of approval). Reclamation includes but is not limited to recontouring disturbed areas and reseeding.

Painting would be required of all permanent surface facilities or equipment approved by the BLM. Surface facilities or equipment includes such things as tank batteries, pump jacks and meter runs. The color 'Carlsbad Canyon' on the Standard Environmental Colors Chart normally would be used. The use of one or more of the other nine standard environmental colors would be required if NEPA analysis determined the need to reduce visual impacts by painting.

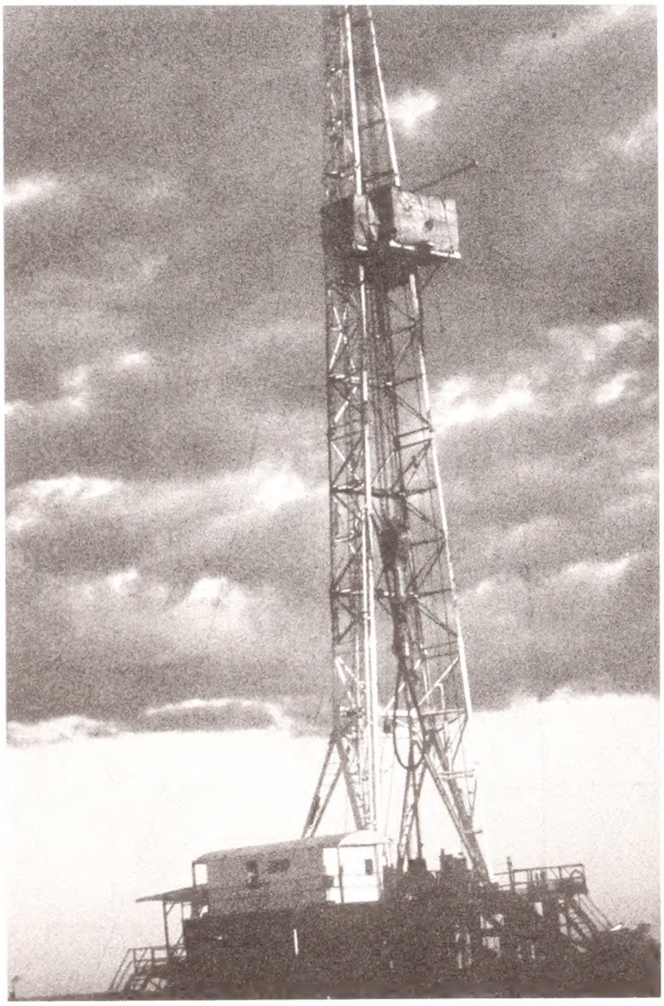
CARLSBAD RESOURCE AREA

The BLM administers approximately 4,095,000 million acres of federal oil and gas mineral estate in the Carlsbad Resource Area. Under this alternative:

Approximately 3,594,346 acres (88 percent of the oil and gas mineral estate) would be open to leasing and development under the BLM's standard terms and conditions.

Approximately 119,922 acres (3 percent) would be open to leasing with controlled surface use restrictions (Tables 8 and 9, and Map 10), which would be applied as stipulations to new leases or as conditions of approval to actions on existing leases, when needed following NEPA analysis. (NOTE: This acreage includes 25,600 acres in the East Guadalupe Escarpment Habitat Management Area, which is described in "Management Common to All Alternatives".) These restrictions are:

- No Surface Occupancy would be allowed within 660 feet (200 meters) of the following springs or riparian habitat: Bogle Flat Spring (5 acres); Preservation Spring (55 acres); Owl Spring (53 acres); Blue Spring (160 acres); and Little McKittrick Draw Habitat Management Area (407 acres).



Oil and gas drilling is a major use of the public lands in the Roswell District.

TABLE 8

SUMMARY OF OIL AND GAS LEASING RESTRICTIONS, BY ALTERNATIVE, BY HYDROCARBON POTENTIAL (ESTIMATED SURFACE ACRES[1]) CARLSBAD RESOURCE AREA

Alternatives	Hydrocarbon Potential	Closed To Leasing	Open To Leasing With NSO[2]	Open To Leasing With Controlled Surface Use[2]	Open To Leasing With With Timing Restrictions[2]	Open To Leasing[3]
A	H	89,457	92,213	94,322	195,462	3,069,546
	M		3,600	25,600		169,800
	L					327,000
B	H	127,539	58,647	30,320	N/A	3,452,033
	M		3,600	25,600	N/A	169,800
	L					327,000
C	H	87,012	61,407	30,320	N/A	3,362,261
	M		3,600	25,600		169,800
	L					327,000
D	H	105,577	79,067	30,320	N/A	3,326,261
	M		3,600	25,600	N/A	169,800
	L					327,000
E	H	107,097	77,547	30,320	N/A	3,326,036
	M		3,600	25,600		169,800
	L					327,000

[1] Includes BLM-administered surface and surface administered by other surface management agencies or owners.

[2] Does not include acreage that may be affected by Surface Use and Occupancy Requirements (Appendix 3).

[3] Open to leasing under Standard Terms and Conditions, Surface Use and Occupancy Requirements, Conditions of Approval, and Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas.

Source: BLM files, 1994.

TABLE 9
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
CARLSBAD RESOURCE AREA
ALTERNATIVE A

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
Blue Spring[2]	160		
Bogle Flat Spring[2]	5		
City of Carlsbad Water Well Field	29,520		
East Guadalupe Escarpment Habitat Management Area		25,600	
Little McKittrick Draw Habitat Management Area[2]	407		
Owl Spring[2]	53		
Preservation Spring[2]	55		
Southern Gypsum Soil Area[2]	62,840		
Subtotal	93,040	25,600	
OTHER AGENCY MANAGEMENT:			
Air Base City, Hobbs Industrial Air Park	160		
Artesia Airport	200		
Carlsbad Airport	160		
Jal Airport	280		
Lincoln National Forrest	N/A[3]		
Subtotal	800		
Total	93,840	25,600	

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[1] Includes areas described in Management Common to All Alternatives.

[2] Leasing stipulations for these areas will be replaced in other alternatives by the Surface Use and Occupancy Requirements (Appendix 3). These areas may not be specifically described in other alternatives.

[3] Amount of affected acreage not known.

Source: BLM files, 1994.

On approximately 62,840 acres in the Southern Gypsum Soil Area, all vehicle use, including that for geophysical operations, would be restricted to designated or authorized access routes.

Approximately 195,462 acres (5 percent) would be open to leasing with timing restrictions (Tables 8 and 10, and Map 10), which would be applied as stipulations to new leases or as conditions of approval to actions on existing leases, when needed following NEPA analysis.

The timing restrictions are:

- Prairie Chicken habitat, no oil and gas drilling activities during the period of April 1 to May 31, each year.
- Heronries habitat, no oil and gas drilling activities within one-quarter mile of any active colonial bird colony during the period of April 1 to July 30, each year, and no vehicle use within one-quarter mile of active heronries from April 1 to July 30, each year, except for use on designated or authorized access routes.

Approximately 92,313 acres (2 percent) would be open to leasing with no surface occupancy restrictions (Tables 8 and 11, and Map 10), which would also be applied to new leases.

Approximately 89,457 acres (2 percent) would be closed to future leasing in order to protect special resources or to support other public uses (Tables 8 and 12, and Map 10). In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

TABLE 10
AREAS OPEN TO FUTURE LEASING WITH TIMING RESTRICTIONS CARLSBAD RESOURCE AREA ALTERNATIVE A

Areas	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
Lesser Prairie Chicken Habitat	162,822		
Phantom Banks and Tamarisk Flat Heronries	32,640		
Total	195,462		

Note: Leasing stipulations for these areas will be replaced in other alternatives by the Surface Use and Occupancy Requirements (Appendix 3). These areas will not be specifically described in other alternatives.

Source: BLM files, 1994.

TABLE 11
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
CARLSBAD RESOURCE AREA
ALTERNATIVE A

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Ben Slaughter Draw[2]	290		
Bluntnose Shiner HMA[2]	200		
Chosa Draw ACEC	2,820		
Cottonwood Spring[2]	144		
CP Hill Buckwheat Population	360		
Fence Canyon Caves[2]	359		
Guadalupe Escarpment Scenic Area (Zone 1)	11,700		
Honest Injun Cave[2]	43		
KFF Caverns[2]	130		
Laguna Plata Archaeological District	3,360		
Lonesome Ridge ACEC[3]	2,990		
Lost Cave[2]	30		
Maroon Cliffs Archaeological District	1,880		
McKittrick Hill Caves	4,920		
Pecos River/Canyons Complex ACEC/RNA	4,465		
Pecos River Corridor[2]	10,000		
Poco Site	265		
Pope's Well	80		
Seven Rivers Hills HMA	540		
South Texas Hill Canyon RNA		3,600	
Yellow Jacket/Lair Caves[2]	260		
Yeso Hills RNA	557		
Subtotal	45,393	3,600	
OTHER AGENCY MANAGEMENT:			
Avalon Reservoir	14,800		
Brantley Lake State Park	10,000		
Brantley Reservoir	21,000		
Lincoln National Forest	N/A[4]		
Living Desert State Park	1,120		
Subtotal	46,920		
Total	92,313	3,600	

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[1] Includes areas described in Management Common to All Alternatives.

[2] Leasing stipulations for these areas will be replaced in other alternatives by the Surface Use and Occupancy Requirements (Appendix 3), or other management. These areas may not be specifically described in other alternatives.

[3] Lonesome Ridge ACEC is currently closed to leasing because it is within the Lonesome Ridge WSA. If the WSA is not designated as wilderness, the NSO will be applied to the ACEC.

[4] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 12
AREAS CLOSED TO FUTURE LEASING
CARLSBAD RESOURCE AREA
ALTERNATIVE A

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Cave Protection Zones	10,120		
Devils Den WSA	320		
Little Walt Canyon Quarry Site	40		
Lonesome Ridge WSA[2]	3,505		
McKittrick Canyon WSA	200		
Mudgetts WSA[3]	1,060		
Subtotal	15,245		
OTHER AGENCY MANAGEMENT:			
Carlsbad Caverns National Park/Wilderness	46,530		
Gnome Site	680		
Lincoln National Forest	26,282		
State Militia Site	720		
Subtotal	74,212		
Total	89,457		

[1] Includes areas described in Management Common to all Alternatives.

[2] The 2,990-acre Lonesome Ridge ACEC is within the Lonesome Ridge WSA. The ACEC would remain closed to leasing even if the WSA is not designated as wilderness.

[3] Acreage shown is that part of the WSA outside the cave protection zones, which would become available for future leasing if the WSA is not designated as wilderness.

Source: BLM files, 1994.

ROSWELL RESOURCE AREA

The BLM administers approximately 9,740,000 acres of federal mineral estate in the Roswell Resource Area. Under this alternative:

Approximately 8,410,390 acres (86 percent of the mineral estate) would be open to leasing and development under the BLM's standard terms and conditions.

Approximately 12,105 acres (< 1 percent) would be open to leasing with controlled surface use restrictions (Tables 13 and 14, and Map 11), which would be applied as stipulations to new leases or as conditions of approval to actions on existing leases, when needed following NEPA analysis. The restrictions area:

In the Ute Lake and Bottomless Lakes State Parks, no surface disturbance would be allowed unless the State of New Mexico, Parks and Recreation Division concurred with the proposed surface use activity.

Oil and gas activities would be restricted within wetlands or riparian habitat areas along the Pecos River floodplain.

Approximately 935,000 acres (10 percent) of prairie chicken habitat would be open to leasing with timing restrictions (Table 13 and Map 11), which would be applied as stipulations to new leases or as conditions of approval to actions on existing leases, when needed following NEPA analysis. The timing restriction is:

- Prairie Chicken habitat, no oil and gas activities during the period of April 1 to May 31, each year.

Approximately 22,329 acres (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 13 and 16, and Map 11.

Approximately 360,352 acres (4 percent) would be closed to leasing to protect resources or to support other public uses (Tables 13 and 17, and Map 11). In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, the area would not be re-offered for leasing.

Locatable Minerals

Management under alternative A is described in "Management Common to All Alternatives." (Refer to Table 5.)

Solid Leasable Minerals

Goal: Continue to keep lands available for the leasing of solid minerals while maintaining important environmental values.

Additional management under this alternative is described in "Management Common to All Alternatives" and in Alternative A for the Fort Stanton ACEC.

Lands in the following areas would remain closed to solid mineral leasing:

- Mathers Research Natural Area, 242 acres
- Torgac Cave National Natural Landmark, 40 acres

Saleable Minerals

Management under this alternative is described in "Management Common to All Alternatives" and in Alternative A for the Fort Stanton ACEC.

LANDS AND REALTY MANAGEMENT

Goal: Manage the public lands to support the goals and objectives of other resource programs, to respond to public demand for land use authorizations, and to acquire administrative and public access where necessary.

Utility and Transportation System

Rights-of-way exclusion zones would be retained on the following areas (Map 12):

- Little Black Peak and Carrizozo Lava Flow WSAs (25,321 acres);
- Border Hill Structural Zone National Natural Landmark (150 acres);

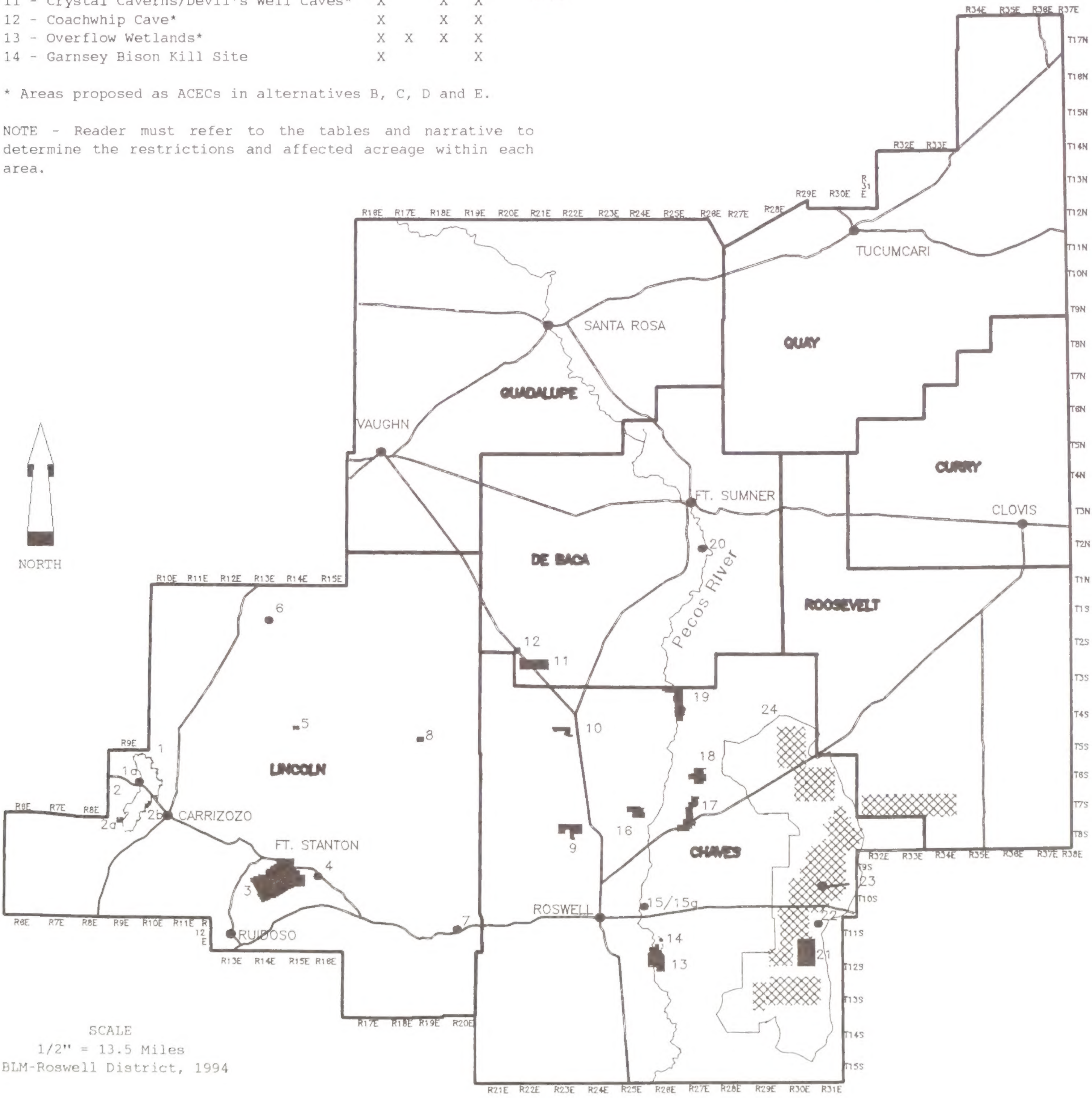
Rights-of-Way Exclusion Areas, by Alternative

	A	B	C	D	E
1 - Little Black Peak WSA	X	X	X	X	X
1a - Millrace Cave*		X		X	X
2 - Carrizozo Lava Flow WSA	X	X	X	X	X
2a - Crockett Cave*		X		X	X
2b - Valley of Fires Recreation Area		X	X	X	X
3 - Fort Stanton*		X		X	X
4 - Rio Bonito Acquired Lands		X	X	X	X
5 - Zia Christine Cave*		X		X	X
6 - Alleged UFO Crash Sites		X	X	X	X
7 - Border Hill NNL	X	X	X	X	X
8 - Torgac Cave*		X		X	X
9 - Angora-Corn Cave*		X		X	X
10 - Martin-Antelope GYP Cave*		X		X	X
11 - Crystal Caverns/Devil's Well Caves*		X		X	X
12 - Coachwhip Cave*		X		X	X
13 - Overflow Wetlands*		X	X	X	X
14 - Garnsey Bison Kill Site		X			X

	A	B	C	D	E
15 - Bat Hole Cave*		X		X	X
15a- Comanche Hill	Not Applicable				
16 - Cocklebur Lakes Arch. District		X		X	X
17 - Haystack Mountain OHV Area		X			
18 - Haystack Butte Arch. District		X		X	X
19 - North Pecos River*		X		X	X
20 - Billy the Kid Recreation Area	Not Applicable				
21 - Mescalero Sands OHV Area	Not Applicable				
22 - Mescalero Sands*	X	X		X	X
23 - Mathers RNA		X	X	X	X
24 - Caprock WHA	Not Applicable				
▨ - Prairie Chicken Core Habitat	Not Applicable				

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the restrictions and affected acreage within each area.



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 12
RIGHTS-OF-WAY EXCLUSION AREAS
Roswell Resource Area

TABLE 13
SUMMARY OF OIL AND GAS LEASING RESTRICTIONS, BY ALTERNATIVE, BY HYDROCARBON POTENTIAL
(ESTIMATED SURFACE ACRES[1/])
ROSWELL RESOURCE AREA

Alternatives	Hydrocarbon Potential	Closed To Leasing	Open To Leasing With NSO[2/]	Open To Leasing With Controlled Surface Use[2/]	Open To Leasing With With Timing Restrictions[2/]	Open To Leasing[3/]
A	H	8,265	22,149	12,105	935,000	4,516,481
	M	206,108	180			2,394,534
	L	145,975				1,530,199
B	H	45,290	21,421	1,320	N/A	5,425,969
	M	207,668	613			2,392,541
	L	149,171				1,527,007
C	H	15,055	51,483	1,320	N/A	5,426,142
	M	206,068	2,213			2,392,541
	L	145,971	3,200			1,527,007
D	H	31,599	36,992	1,320	N/A	5,424,159
	M	207,668	613			2,392,541
	L	149,171				1,536,007
E	H	42,390	26,203	1,320	N/A	5,424,087
	M	207,668	150			2,393,004
	L	146,611	2,560			1,527,007

[1/] Includes BLM-administered surface and surface administered by other surface management agencies or owners.

[2/] Does not include acreage that may be affected by Surface Use and Occupancy Requirements (Appendix 3).

[3/] Open to leasing under Standard Terms and Conditions, Surface Use and Occupancy Requirements, Conditions of Approval, and Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas.

Source: BLM files, 1994.

TABLE 14
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
ROSWELL RESOURCE AREA
ALTERNATIVE A

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	 Moderate	 Low
BLM MANAGEMENT:			
Pecos River Floodplain[2]	8,000		
OTHER AGENCY MANAGEMENT:			
Melrose Bombing Range, buffer area	1,000		
Santa Rosa Municipal Airport	320		
Two Rivers Reservoir Project	2,785		
Subtotal	4,105		
Total	12,105		

[1] Includes areas described in Management Common to All Alternatives.

[2] Comprises scattered tracts along the Pecos River.

Source: BLM files, 1994.

TABLE 15
AREAS OPEN TO FUTURE LEASING WITH TIMING RESTRICTIONS
ROSWELL RESOURCE AREA
ALTERNATIVE A

Areas	Hydrocarbon Potential Estimated Surface Acres High	 Moderate	 Low
Lesser Prairie Chicken Habitat	935,000		
Total	935,000		

Note: The leasing stipulation covering this area will be replaced in other alternatives by the Surface Use and Occupancy Requirements (Appendix 3). This area will not be specifically described in other alternatives.

Source: BLM files, 1994.

TABLE 16
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
ROSWELL RESOURCE AREA
ALTERNATIVE A

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Mescalero Sands Outstanding Natural Area	2,934		
Overflow Wetlands WHA	870		
Torgac Cave National Natural Landmark		180	
Subtotal	3,804	180	
OTHER AGENCY MANAGEMENT:			
Bitter Lake National Wildlife Refuge	6,320		
Bottomless Lakes State Park	460		
Cibola National Forest			N/A[2]
Fort Sumner Project and Sumner Lake State Park	11,240		
Lincoln National Forest			N/A[2]
Tucumcari Project	7		
Ute Lake State Park	325		
Subtotal	18,352		
Total	22,156	180	

[1] Includes areas described in Management Common to All Alternatives.

[2] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 17
AREAS CLOSED TO FUTURE LEASING
ROSWELL RESOURCE AREA -- ALTERNATIVE A

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
Fort Stanton			27,622
Little Black Peak and Carrizozo Lava Flow WSAs		25,312	
Mathers Research Natural Area	242		
Torgac Cave National Natural Landmark		40	
Subtotal	242	25,352	27,622
OTHER AGENCY MANAGEMENT:			
Cibola National Forest			19,178
Grulla National Wildlife Refuge	69		
Lincoln National Forest			99,179
Melrose Bombing Range, core area	6,714		
Salt Creek Wilderness	1,240		
White Sands Missile Range		180,756	
Subtotal	8,023	180,756	118,349
Total	8,265	206,108	145,979

[1] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

TABLE 18
LANDS CONSIDERED SUITABLE FOR POTENTIAL ACQUISITION
ROSWELL RESOURCE AREA -- ALTERNATIVE A

Areas[1]	Private	State
Carrizozo Lava Flow and Little Black Peak WSAs	5,512	4,321
Overflow Wetlands WHA	963	
Rio Bonito[2] 1,000	1,000	
Total	7,475	4,321

[1] Includes areas described in "Management Common to All Alternatives."

[2] Refers to the possible acquisition of a mixture of private and state lands, up to 2,000 acres, that could include the Rio Bonito Waterfall, NMSU facilities at Fort Stanton, state lands adjacent to Fort Stanton, and Tract 5 of the Rio Bonito exchange. Specific acreages have not been established under this alternative, so the 2,000 acres have been split between state and private lands for purposes of disclosure.

Source: BLM files, 1994.

- Mescalero Sands Recreation Complex (6,617 acres);

- Mescalero Sand Dunes Outstanding Natural Area (4,708 acres, including 2,799 acres in the National Natural Landmark);

- Mescalero Sands National Natural Landmark (360 acres not included in the Mescalero Sand Dunes Outstanding Natural Area).

Acquisition

Approximately 963 acres of private land in the Overflow Wetlands Wildlife Habitat Area (WHA) would be acquired to increase wetland acreage in the WHA and to serve as a buffer around the wetlands. Refer to Table 18 and Map 13.

The acquisition of up to 2,000 acres of lands or interests in lands along the Rio Bonito would be pursued if opportunities arise. Priority would be given to the acquisition of Tract 5 in the Rio Bonito exchange proposed by the Lincoln Valley Land Company.

Disposal

The disposal of about 3,155 acres of public land, which were identified in the East Chaves Management Framework Plan, would be allowed.

Any of these lands having riparian, scenic or recreational values would be retained.

LIVESTOCK GRAZING MANAGEMENT

Goal: Provide effective and efficient management of allotments to maintain, improve, and monitor range conditions.

Vegetation management projects identified in the East Roswell Environmental Impact Statement, the West Roswell Management Framework Plan Amendment, or Allotment Management Plans and carried forward into this plan are described in the "Vegetation Management" section.

Grazing systems developed on allotments in the Caprock Wildlife Habitat Area (WHA), in coordination with the permittees, would include one of the following rest treatments on allotments:

- 16 consecutive months of rest (beginning in March) within a 4-year period

- 20 consecutive months of rest (beginning in March) within a 4-year period

- 2 consecutive years rest out of every 4 years

The stocking rate of sheep in the Macho WHA must not exceed 50 sheep per section in any given pasture.

Management proposed in this alternative would result in a reduction in the amount of livestock grazing authorized on the public lands. Table 19 summarizes estimated AUM (animal unit month) reductions that may result from certain management actions.

VEGETATION MANAGEMENT

The management objective for vegetation is currently set by resource management programs such as range management or wildlife. The management goals for vegetation are addressed in terms of Ecological Range Site Condition objectives and goals. The management objective must be within an ecological site's capability to produce those attributes through natural succession, management action, or both.

Decisions from the East Roswell EIS, the West Roswell MFPA or Allotment Management Plans would continue to be implemented, in conformance with the Record of Decision for Vegetation Treatment on BLM Lands in the Thirteen Western States (1991). Remaining projects and acreages are:

- Mechanical control on approximately 17,477 acres

- Chemical control on approximately 225,610 acres

- Burn treatments on approximately 105 acres

Refer to the East Roswell EIS, and the West Roswell MFPA for criteria for development of new projects under this alternative.

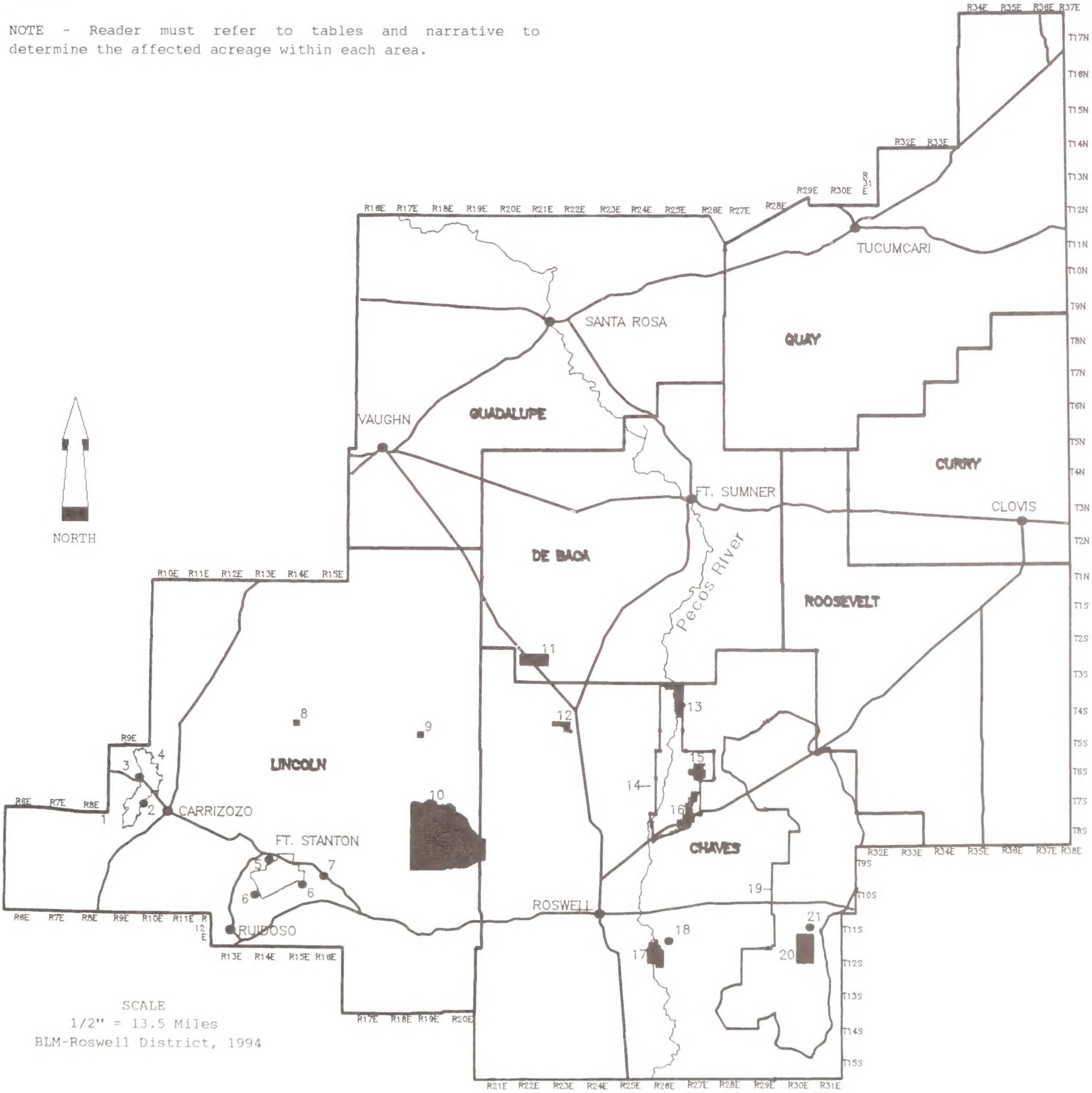
The management objective for the grassland; shinnery oak-dune; mixed shrub malpais; pinon-juniper grassland; mixed desert shrub; and

Potential Acquisitions, by Alternative

	A	B	C	D	E
1 - Carrizozo WSA	X	X	X	X	X
2 - Valley of Fires Recreation Area		X		X	X
3 - Millrace Cave*		X	X	X	X
4 - Little Black Peak WSA	X	X	X	X	X
5 - Rio Bonito Waterfall		X	X	X	X
6 - Land adjacent to Ft. Stanton		X	X	X	X
7 - Rio Bonito Acquired Lands	X	X	X	X	X
8 - Zia Christine Cave*		X	X	X	X
9 - Torgac Cave*		X	X	X	X
10 - Cedar Hills Deer Area		X		X	X
11 - Crystal Caverns/Devil's Wells Caves		X	X	X	X
12 - Martin-Antelope Cave*		X	X	X	X
13 - North Pecos River*		X		X	X
14 - Pecos River Deer Area		X		X	X
15 - Haystack Butte Acrh. District		X	X	X	X
16 - Haystack Mountain OHV Area		X	X	X	
17 - Overflow Wetlands*	X	X	X	X	X
18 - Garnsey Bison Kill Site		X		X	X
19 - Caprock WHA		X		X	X
20 - Mescalero Sands*		X	X	X	X
21 - Mescalero Sands OHV Area		X	X	X	X

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to tables and narrative to determine the affected acreage within each area.


NORTH
TUCUMCARI
SANTA ROSA
QUAY
VAUGHN
GUADALUPE
FT. SUMNER
CURRY
CLOVIS
DE BACA
Pecos River
ROOSEVELT
LINCOLN
CARRIZOZO
FT. STANTON
RUIDOSO
CHAVES
ROSWELL
1
2
3
4
5
6
6
7
8
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17
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21
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E R32E R33E R34E R35E R36E R37E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
R10E R11E R12E R13E R14E R15E R9E R8E R7E R6E

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 13
POTENTIAL ACQUISITIONS
Roswell Resource Area

drainages, draws and canyons plant communities is to:

- Maintain or increase vegetative composition and production to achieve the Ecological Range Site Goals, which are to attain potential plant community as described in the Soil Conservation Service Range Site Guides.

The practices that would be employed to meet the management objective are:

- Vegetation treatments, including but not limited to, prescribed fire or prescribed natural fire; and biological, chemical (except on shinnery oak), or mechanical controls.

- Grazing treatments such as changes in season of use, class of livestock, or numbers of livestock.

- Range improvements such as fences, water developments, erosion control structures, reseedings, or vegetative sales.

- Forage utilization levels would not exceed 45 percent of annual plant production.

There is no current management objective based on Ecological Range Site Goals for the riparian-wetlands community. Current SCS range site descriptions do not adequately describe potential plant communities for riparian-wetland areas and adequate data on the community is lacking.

OUTDOOR RECREATION MANAGEMENT

Recreation Management

Goal: Ensure the continued availability of outdoor recreation opportunities and experiences that are not readily available on adjacent public or private lands. Protect the health and safety of visitors and natural, cultural, and other resource values. Stimulate public enjoyment of public land and resolve user conflicts.

The Mescalero Sands North Dune Off-Highway Vehicle (OHV) Area would be managed for intensive OHV use with emphasis on providing a quality play area for OHV's. Planned upgrades and development include sun shelters, rest rooms and potable water.

Lands acquired along the Rio Bonito near Lincoln (Tracts 1-4) would be managed for low intensity recreational use. Recreation activities that would be emphasized are fishing, nature viewing and trail and non-trail hiking. The development at these sites could include dirt access roads and parking areas. The proposed interpretive theme for the Rio Bonito acquired lands would be the "Historic and prehistoric settlements in the Lincoln Valley".

The area listed below and in Table 17 would be closed to the leasing of oil and gas.

- Mathers Research Natural Area

Federal mineral estate at Ute Lake and Bottomless Lakes state parks would be leased for oil and gas with "no surface occupancy", only with concurrence from the State of New Mexico Parks and Recreation Division.

Cave and Karst Resource Management

Goal: Protect unique cave values while allowing for recreational, educational, scientific and commercial use where such use would not conflict with the protection of those values.

The BLM would continue to manage caves in accordance with the regulations implementing the Federal Cave Resources Protection Act and Roswell District and Resource Area cave management plans.

The Potential Cave or Karst Occurrence Lease Notice would be applied to oil and gas leases issued in cave or karst areas, to alert lease purchasers and operators of the possible requirements for special drilling practices in those areas.

The Authorized Officer would continue to move proposed drilling locations up to 200 meters away from known cave entrances or significant karst features, when necessary to protect cave or karst resources.

TABLE 19

COMPARISON OF CHANGES IN GRAZING ANIMAL UNIT MONTHS BY ALTERNATIVE
ROSWELL RESOURCE AREA

PROPOSED ACTION	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E
Surface Disturbance due to Oil and Gas	0	-120	-120	-120	-120
Garnsey Bison Kill Site[1/]	0	-72	-24	-24	-24
Haystack Mountain OHV Area[1/]	0	0	0	0	0
Mescalero Sand Dune North OHV Area[1/]	0	-132	0	0	0
Billy the Kid Recreation Site	0	0	-12	-12	-12
Overflow Wetlands ACEC[1/]	0	-120 to -674	-120 to -674	120 to -674	-120 to -674
North Pecos River ACEC	0	-756	0	-756	-756
Mescalero Sand Dune ACEC	0	-1,360	0	-144	-144
Mathers Research Natural Area	0	-48	-48	-48	-48
Roswell Cave Complex ACEC	0	-216	-216	-216	-216
Fort Stanton ACEC[2/]	0	-5,316	0	0	0
Feather Cave Complex[2/]	0	**	-36	72	-6
Disposal of Public Lands[3/]	-720	-34,260	-34,260	-34,260	-34,260
Change in vegetation utilization levels	0	-36,636	+36,636	0	0
Total change in animal unit months if all proposals are implemented.	-720 to 0	-77,676 to -78,834	-1,800 to +754	-36,326 to -37,772	-36,260 to 37,706

Notes: **Included in Fort Stanton ACEC.

Divide numbers (which are animal unit months) by 12 to determine the number of animal units affected. Livestock grazing likely would continue, but the land would transfer from public to private ownership.

[1/] Proposal includes a range of acreage to be excluded.

[2/] Not allocated under the Taylor Grazing Act.

[3/] AUMs reduced because of land disposals represent changes in licensed use on public lands.

Source: RMP team estimates, 1994.

Off-Highway Vehicle (OHV) Management

Goal: Manage OHV use to provide adequate access and reduce adverse impacts on sensitive resource values.

The open to off-highway vehicle use designation on approximately 400,000 acres in the East Chaves Planning Unit (public lands east of the Pecos River) would be retained (See Table 20).

The closed to off-highway vehicle use designation on 98 acres of the Mathers RNA would be retained (see Map 14).

The Wilderness Study Areas (Little Black Peak and Carrizozo Lava Flow) would be managed as limited to existing roads and trails for off-highway vehicle use until the WSAs are designated as wilderness or are released from wilderness consideration. If the lands are released from wilderness consideration, the area would be proposed for closure from OHV use.

The limited to existing roads and trails designation on 22,541 acres of public lands in the Mescalero Sands Recreation Complex would be retained under this alternative. The recreation complex is not retained under other alternatives. A portion of this area is within the proposed Mescalero Sands ACEC.

The limited to designated trails and active dunes designation on 610 acres of public lands in the Mescalero Sands North Dune OHV area would be retained.

The limited to existing roads and trails for motorcycle use designation for the Haystack Mountain OHV area (about 3,500 acres) would be retained. The BLM would continue the development of the Haystack Mountain OHV Area, with emphasis on providing a quality and safe play area for motorcycles.

The limited to designated roads and trails designation on 14,800 acres of public land within Fort Stanton would be maintained to protect primitive recreational opportunities and crucial habitat for the Kuenzler's Hedgehog Cactus. The balance of Fort Stanton would remain designated open for OHV use.

Visual Resource Management

Painting would be required of all permanent surface facilities or equipment approved by the BLM. Surface facilities or equipment includes such things as tank batteries, pump jacks and meter runs. The color 'Carlsbad Canyon' normally would be used. The use of one or more of the other nine standard environmental colors approved by the Rocky Mountain Coordinating Committee would be required if NEPA analysis determined the need to reduce visual impacts by painting.

WATERSHED MANAGEMENT

Brush treatments proposed in existing management plans would be conducted, in part, to increase soil moisture for plant growth and to prevent surface soil erosion from wind and water by increasing density and cover of perennial grasses. Projects would include: mechanical control on as many as 17,477 acres in eastside grazing allotments; chemical control on as many as 225,610 acres resource area-wide; and prescribed burns on as many as 105 acres in eastside grazing allotments. Refer to the "Vegetation Management" section fora related discussion on these projects.

Projects would be considered to enhance watershed conditions along the segment of the Rio Bonito acquired in the Rio Bonito Exchange. Watershed enhancement projects could include streambank stabilization, headcutting and erosion prevention, and revegetation.

WILDLIFE HABITAT MANAGEMENT

Special Status Species Habitat Management

U.S. Fish and Wildlife Service Recovery Plans would be implemented, including the reintroduction of native special status species in suitable areas on public land in coordination and cooperation with local governments. Current plans cover the American peregrine falcon, SW bald eagle, Pecos gambusia, Kuenzler hedgehog cactus, Pecos bluntnose shiner and Black-footed ferret.

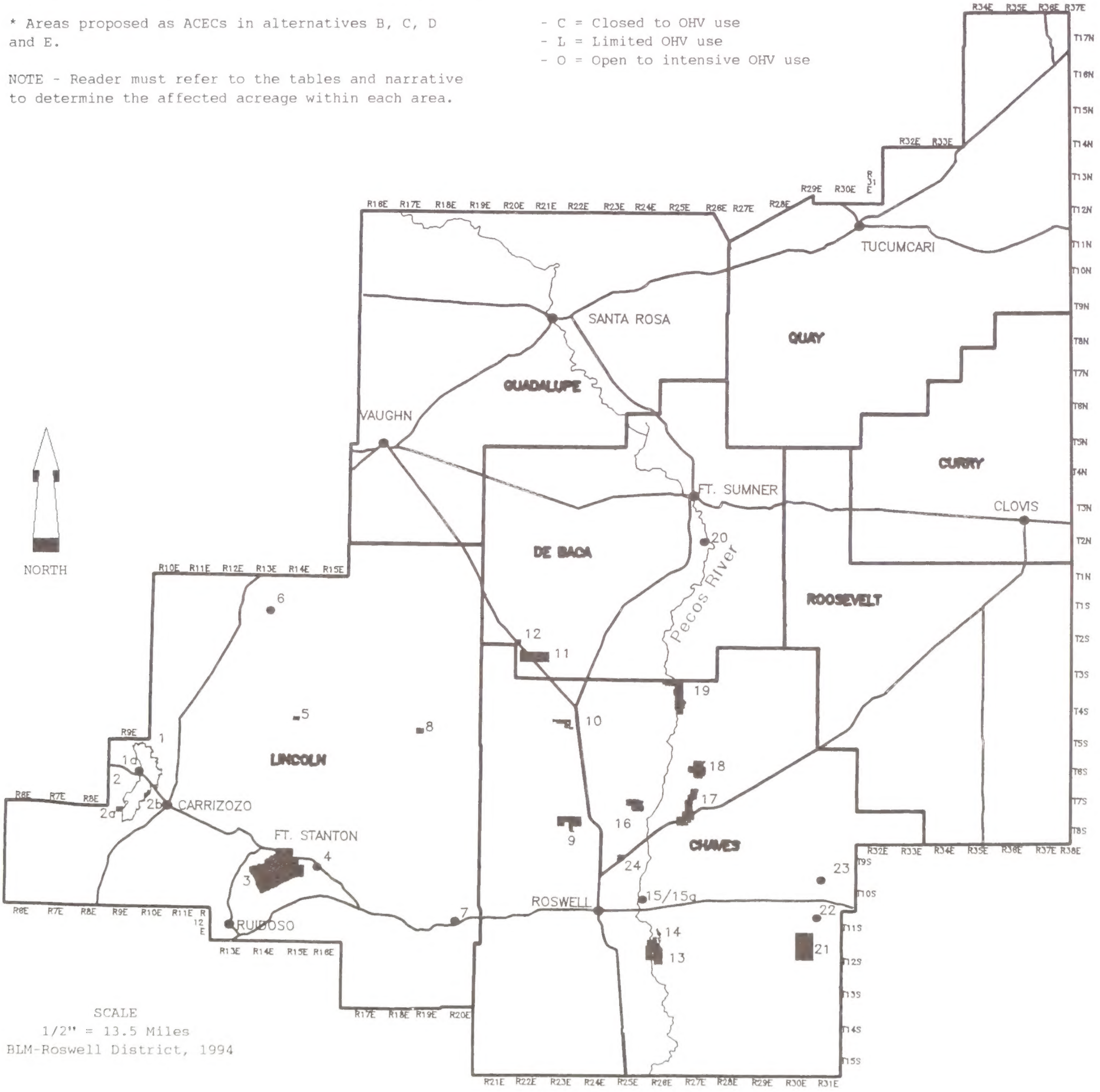
OHV Designations, by Alternative

No.	Area	A	B	C	D	E
1	Little Black Peak WSA	L	C	C	C	C
1a	Millrace Cave*	O	C/L	C/L	C/L	C/L
2	Carrizozo Lava Flow WSA	L	C	C	C	C
2a	Crockett Cave*	O	C/L	C/L	C/L	C/L
2b	Valley of Fires Rec. Area	O	C/L	L	L	C/L
3	Fort Stanton*	L	C/L	C/L	C/L	C/L
4	Rio Bonito Acquired Lands	O	L	L	L	L
5	Zia Christine Cave*	O	C/L	C/L	C/L	C/L
6	Alleged UFO Crash Sites	O	C	O	O	C
7	Border Hill NNL	O	C	C	C	C
8	Torgac Cave*	O	C/L	C/L	C/L	C/L
9	Angora-Corn Cave*	O	C/L	C/L	C/L	C/L
10	Martin-Antelope GYP Cave*	O	C/L	C/L	C/L	C/L
11	Crystal Caverns/ Devil's Well Caves*	O	C/L	C/L	C/L	C/L
12	Coachwhip Cave*	O	C/L	C/L	C/L	C/L
13	Overflow Wetlands*	O	C/L	L	C/L	C/L
14	Garnsey Bison Kill Site	O	C/L	L	C/L	C/L
15	Bat Hole Cave*	O	C/L	C/L	C/L	C/L
15a	Comanche Hill	C	C	C	C	C
16	Cocklebur Lakes Arch. District	O	C	L	L	L
17	Haystack Mountain OHV Area	L	L	L	L	L
18	Haystack Butte Arch. District	O	C	L	L	L
19	North Pecos River*	O	C	L	L	L
20	Billy the Kid Recreation Area	O	L	L	L	L
21	Mescalero Sands*	O	C/L	L	L	C/L
22	Mescalero Sands OHV Area	L	O	O	O	O
23	Mathers RNA	C	C	C	C	C
24	Dunahoo Hills	O	L	L	L	L

* Areas proposed as ACECs in alternatives B, C, D and E.

- C = Closed to OHV use
- L = Limited OHV use
- O = Open to intensive OHV use

NOTE - Reader must refer to the tables and narrative to determine the affected acreage within each area.


NORTH
SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994
TUCUMCARI
SANTA ROSA
QUAY
GUADALUPE
VAUGHN
CURRY
FT. SUMNER
CLOVIS
DE BACA
Pecos River
ROOSEVELT
LINCOLN
CARRIZOZO
FT. STANTON
RUIDOSO
ROSWELL
CHAVES
1
1a
2
2a
2b
3
4
5
6
7
8
9
10
11
12
13
14
15/15a
16
17
18
19
20
21
22
23
24
R34E R35E R36E R37E
R32E R33E
R29E R30E R31E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R10E R11E R12E R13E R14E R15E
R9E
R8E R7E R6E
R8E R7E R6E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S

MAP 14
OHV DESIGNATIONS
Roswell Resource Area

TABLE 20
OFF-HIGHWAY VEHICLE MANAGEMENT DESIGNATIONS
ROSWELL RESOURCE AREA
ALTERNATIVE A

Designation	Area[1/]	Acres
Closed	Comanche Hill "A" Area	660
	Comanche Hill "C" Area	240
	Mathers RNA	98
	Mescalero Sands ONA[2/]	1,838
Total Closed		2,836
Limited Existing Roads/Trails for Motorcycles	Haystack Mountain OHV Area	3,500
Limited Existing Roads/Trails	Carrizozo Lava Flow and Little Black Peak WSAs [3/]	25,312
	Mescalero Sands ONA[2/]	4,334
	Mescalero Sands Recreation Complex[2/]	22,541
Designated Roads/Trails	Fort Stanton	14,800
Designated Dunes/Trails	Mescalero Sands North Dune OHV Area	610
Total Limited		71,097
Open	East Chaves Planning Unit[4/]	400,000
	Resource Area (remaining undesignated acres)[5/]	1,016 067
Total Open		1,416,067

[1/] Includes areas described in "Management Common to All Alternatives."

[2/] The Mescalero Sands ONA and Mescalero Sands Recreation Complex are listed here, but are not shown on Map 14, OHV designations. The ONA is included in the area shown as the Mescalero Sands ACEC. The recreation complex is only in Alternative A.

[3/] Short roads on the perimeter of the WSA could be used as long as use would not impair the area's wilderness characteristics.

[4/] Public lands east of the Pecos River.

[5/] BLM surface ownership west of the Pecos River.

Source: BLM files, 1994.

Big Game/Upland Game Habitat Management

Firewood sales would be authorized in selected pinon-juniper areas unsuitable for prescribed burning.

Oil and gas resources underlying about 935,000 acres of lesser prairie chicken habitat would be leased with timing stipulations. No oil and gas activities would be allowed during the period of April 1 to May 31, each year.

Riparian/Wetland and Playa Lake Management

Prescribed fire, mechanical control or chemical control would be used to control salt cedar on as many as 700 acres over 20 years in selected riparian-wetland areas in the Fort Stanton and Overflow Wetlands wildlife habitat management areas. Exclusion or buffer areas would be identified where treatment would not be conducted.

Springs, reservoirs, earthen tanks and playa lakes would be enhanced by constructing protective exclosures, establishing vegetation for wildlife cover, and providing off-site livestock waters.

About 870 acres in the Overflow Wetlands WHA would be open to oil and gas leasing with "no surface occupancy."

Oil and gas activities would be restricted on about 8,000 acres in wetlands or riparian habitat along the Pecos River floodplain.

Fisheries Habitat Management

Construction of streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection would be allowed for the Rio Bonito, Salado Creek and the Pecos River. Criteria for consideration include, but are not limited to, areas that:

- Exhibit streambank sloughing;
- Lack riparian vegetation or regeneration;
- Exhibit invasion of exotic or undesirable plant species;
- Exhibit erosion of side drainages;
- Lack riparian pastures to control livestock use.

FIRE MANAGEMENT

Goal: Limit damage to natural resources and to life and property caused by wildfire. Wherever possible, restore fire to its natural role in the ecosystem through the use of prescribed fire. Use prescribed fire as a tool for land treatment to replace or augment the use of chemical and mechanical treatments.

Prescribed fire

Prescribed fires ignited by the BLM would be conducted on up to 105 acres. Each fire would accomplish specific land management objectives identified by specialists in one or more of the Resource Area's management programs. Prescribed natural fire would not be employed to accomplish management objectives.

Protection from wildfire

Full suppression of wildfire would be employed in the following areas to protect man-made facilities or important natural resource values.

Protection of life or property, in any situation

- Valley of Fires Recreation Site
- Rio Bonito Campground
- Fort Stanton screening trees
- Kuenzler Cactus areas at Fort Stanton
- Torgac Cave NNL entrance area
- Fort Stanton Cave entrance area

The conditional fire suppression response level would be applied in the remainder of the resource area.

SPECIAL MANAGEMENT AREAS (AREAS OF CRITICAL ENVIRONMENTAL CONCERN)

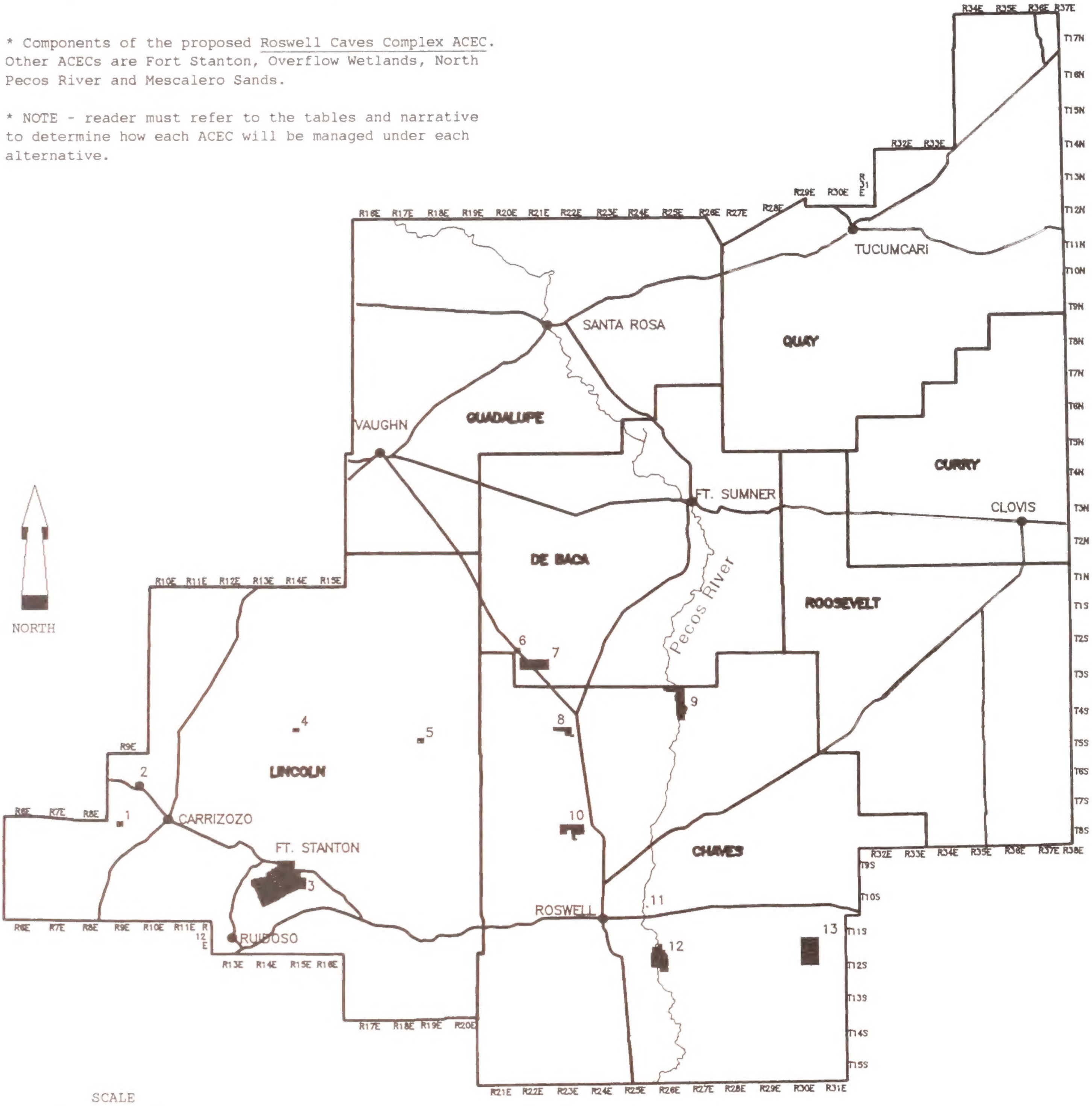
The five areas described below are proposed for ACEC designation under other alternatives. Under current management, these areas would not be proposed as ACECs, but would, nevertheless, have special management emphasis. Refer to Map 15 for locations of these areas. Refer also to Appendix 14 for maps of the specific ACECs.

Proposed ACECs

1 - Crockett Cave*
2 - Millrace Cave*
3 - Fort Stanton
4 - Zia Christine Cave*
5 - Torgac Cave*
6 - Coachwhip Cave*
7 - Crystal Caverns/Devil's Well Caves*
8 - Martin-Antelope GYP Cave*
9 - North Pecos River
10 - Angora-Corn Cave*
11 - Bat Hole Cave*
12 - Overflow Wetlands
13 - Mescalero Sands

* Components of the proposed Roswell Caves Complex ACEC. Other ACECs are Fort Stanton, Overflow Wetlands, North Pecos River and Mescalero Sands.

* NOTE - reader must refer to the tables and narrative to determine how each ACEC will be managed under each alternative.



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 15
PROPOSED AREAS of CRITICAL ENVIRONMENTAL CONCERN
Roswell Resource Area

Overflow Wetlands Area

About 963 acres of private land in the Overflow Wetlands WHA would be acquired to increase wetland acreage and to serve as a buffer to the wetlands.

About 870 acres in the Overflow Wetlands WHA encompassing about 700 acres of wetlands and a 170-acre buffer would be open to future leasing with No Surface Occupancy.

North Pecos River Area

Current use restrictions would remain in effect on about 1,920 acres in the Pecos River floodplain. Surface disturbance created by oil and gas activities would not be allowed in wetland or riparian habitat areas in the floodplain. Proposed oil and gas activities would be evaluated on a case-by-case basis and may be allowed on non-riparian or non-wetland areas in the floodplain. All use of vehicles would be restricted to designated or authorized access routes.

Mescalero Sands Area

All rights-of-way would continue to be excluded on the 6,173-acre Mescalero Sand Dunes ONA. By virtue of overlap, all rights-of-way would continue to be excluded on 2,671 acres of the 3,208-acre Mescalero Sands NNL.

The withdrawal from the public land laws, including the 1872 Mining Law would be maintained on the 6,617-acre Mescalero Recreation Complex.
About 2,934 acres in the Mescalero Sands Outstanding Natural Area would continue to be open to oil and gas leasing with No Surface Occupancy to protect the character of the ONA.

Specific grazing systems would be developed for four allotments to protect and enhance lesser prairie chicken habitat and maintain a representative portion of the shinnery oak/dune community. Each grazing system would employ one of the following rest treatments:

- 16 consecutive months of rest beginning in March within a 4-year period
- 20 consecutive months of rest beginning in March within a 4-year period
- 2 consecutive years rest out of every 4 years

Livestock grazing would continue to be excluded on about 1,838 acres (30 percent of the total) in the ONA to protect cottonwood trees in the dune area and provide for a buffer of shinnery oak/tall grass vegetation around active dunes.

About 1,838 acres in the ONA would remain closed to OHV use. The limited to existing roads and trails designation would be retained on approximately 4,334 acres of public lands in the Mescalero Sands South Dunes Outstanding Natural Area.

Fort Stanton Area

All lands in Fort Stanton would remain withdrawn from the general mining laws and closed to the disposal of saleable and leasable minerals, including oil and gas.

The planned maintenance and upgrading of facilities would continue at the Rio Bonito Campground and the Fort Stanton Cave Campground. The BLM would continue to develop cultural and natural history interpretive opportunities in accordance with the National Boots and Saddles Initiative.

The 2-mile Petroglyph National Recreation Trail would be maintained and upgraded. Approximately 20 miles of horse trails, two miles of hiking trails and 18 miles of mountain bike trails also would be maintained and upgraded.

The BLM would continue to manage Fort Stanton, Agonino and Feather caves in accordance with the regulations implementing the Federal Cave Resources Protection Act and Roswell District and Resource Area cave management plans.

- Permits would be required and use restrictions would be enforced.
- Existing trails and gates would be maintained and upgraded as necessary.
- To the extent possible, given their continued use and management, these caves would be restored to their natural condition by employing actions such as removing graffiti and closing unneeded trails.

The use of OHVs on about 14,800 acres of public lands in Fort Stanton would continue to be limited to designated roads and trails, to protect the Kuenzler hedgehog cactus' critical habitat and recreational opportunities.

Juniper control, including prescribed burns, mechanical treatment or fuelwood sales, would be conducted in selected pinon-juniper community types at Fort Stanton.

Livestock grazing would be authorized on a nine-month basis, from August through April, consistent with wildlife habitat management goals and objectives. Grazing would be authorized in nine pastures, allowed with close monitoring in one riparian pasture, and excluded in several riparian exclosures and the Rio Bonito Campground.

Roswell Cave Complex Area

The BLM would continue to manage Torgac and Crockett caves in accordance with the regulations implementing the Federal Cave Resources Protection Act and Roswell District and Resource Area cave management plans.

- Permits would be required and use restrictions would be enforced.
- Existing trails and gates would be maintained and upgraded as necessary.
- To the extent possible, given their continued use and management, these caves would be restored to their natural condition by employing actions such as removing graffiti and closing unneeded trails.

Approximately 40 acres of the Torgac Cave NNL would be closed to the leasing of oil and gas and the remaining 180 acres would be open to the leasing of oil and gas with "no surface occupancy."

ALTERNATIVE B

Alternative B emphasizes preserving or improving important environmental values. It still provides for use of resources and values provided the goals of this alternative can be met.

In this alternative, management proposed for the Carlsbad Resource Area is found only in the Fluid Minerals section under the Minerals Management heading and in appendixes referenced in that section. All other proposed management in this alternative is for the Roswell Resource Area. The term "resource area" applies to the Roswell Resource Area.

The Surface Use and Occupancy Requirements (Appendix 3) would be applied, when applicable, to all actions described in this alternative.

MINERALS MANAGEMENT

Fluid Minerals

Goal: Provide increased protection and preservation of cultural and paleontological, soil, vegetation, water, visual, recreation, and wildlife resource values, particularly in special management areas. Management constraints would be placed on a number of special management areas. Stipulations would be attached to new leases.

ROSWELL DISTRICT

The BLM administers approximately 13,835,000 acres of federal oil and gas mineral estate in the Roswell District. Under this alternative:

Approximately 13,221,051 acres (96 percent of the oil and gas mineral estate) district-wide would be open to leasing and development under the BLM's standard terms and conditions; the Surface Use and Occupancy Requirements for this alternative (Appendix 3); the Roswell District Conditions of Approval (Appendix 4); and the Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas for this alternative (Appendix 5). The discrete components of these requirements would be applied on a case-by-case basis when needed to mitigate impacts or guide use. The Surface Use and Occupancy Requirements would be applied to new leases or as conditions of approval for proposed activities on existing leases, following NEPA analysis. The Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas would be applied as conditions of approval.

As a result of these requirements, some existing leasing stipulations would be rescinded or would be replaced by revised stipulations, in both the Carlsbad and Roswell resource areas. The proposed changes are summarized in Table 21.

Approximately 84,281 acres (1 percent) would be open to leasing district-wide, with a stipulation that No Surface Occupancy would be allowed on new leases issued. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 529,668 acres (4 percent) would be closed to leasing, district-wide. In these areas, existing leases would continue to be developed on a case-by-case basis. However, once leases terminate, they would not be re-offered for leasing.

Produced water disposal pits on public lands would not be allowed west of the Pecos River, within 100-year floodplains, or within 400 meters of drainages, playas, water wells, or springs throughout the district. In all other areas in the Roswell District, the disposal of produced water in lined pits would be permitted on public lands.

Revegetation of disturbed areas would be required. Reclamation techniques such as deeper rips, different seed mixtures, mulching, and the applications of fertilizer would be used to accelerate the reclamation of pits, roads and pads, to provide for maximum ground and surface water protection. The removal of caliche from roads and pads could be required to enhance reclamation efforts. Waiver of this requirement would be considered if diligent attempts to revegetate a site have failed and the Authorized Officer determines that further attempts would be futile.

TABLE 21
COMPARISON OF CURRENT ROSWELL DISTRICT OIL AND GAS LEASING STIPULATIONS WITH PROPOSED LEASING STIPULATIONS

Current Stipulation	Type of Restriction	Feature	Area	Rescind, Replace or Retain
R 3100-13		Potash	CRA	Retain
Roswell 1	NSO	Pope's Well National Register Site	CRA	Retain
Roswell 2	Timing	Important Seasonal Wildlife Habitat (Lesser Prairie Chicken)	RDO	Replace with SUOR
Roswell 3	Timing	Important Seasonal Wildlife Habitat (Antelope)	RRA	Rescind
Roswell 4	NSO	Mescalero Sands Outstanding Natural Area	RRA	Replace with SUOR, ACEC
Roswell 5	CSU	Cave and Karst Resource	RDO	Replace with SUOR
Roswell 6	NSO	Torgac Cave National Natural Landmark	RRA	Replace with SUOR, ACEC
Roswell 7	NSO	Maroon Cliffs Archaeological District	CRA	Retain, expand
Roswell 8	NOL	Torgac Cave National Natural Landmark	RRA	Replace with SUOR, ACEC
Roswell 9	NSO	Laguna Plata Archaeological District	CRA	Retain
Roswell 10	NOL	Mathers Research Natural Area	RRA	Rescind (not needed as stip.)
Roswell 11	NSO	Overflow Wetlands Habitat Area	RRA	Replace with ACEC
Roswell 12	CSU	Ute Lake State Park	RRA	Replace with NSO
Roswell 13	CSU	Bottomless Lake State Park	RRA	Replace with NSO
Roswell 14	CSU	Valley of Fires	RRA	Replace with NSO
Roswell 15	NSO	Living Desert State Park	CRA	Rescind (will go to NOL)
Roswell 16	NSO	Threatened Plant Species (Gypsum wild-buckwheat)	CRA	Retain
Roswell 17	NOL	WIPP Exchange	CRA	Rescind (not needed as stip.)
Roswell 18	CSU	Maroon Cliffs	CRA	Rescind
Roswell 19	NSO	Cave Resources	CRA	Replace with SUOR, except for Chosa Draw ACEC
Roswell 20	CSU	Chosa Draw Caves ACEC	CRA	Rescind
Roswell 21	NSO	South Texas Hill Canyon	CRA	Retain
Roswell 22	NSO	Natural and Scenic Values	CRA	Retain except for Dark Canyon
Roswell 23	CSU	Dark Canyon ACEC/Scenic Area	CRA	Rescind
Roswell 24	Timing	Dark Canyon ACEC/Scenic Area	CRA	Rescind
Roswell 25	CSU	Guadalupe Escarpment Scenic Area	CRA	Rescind (Replace with Partial NSO)
Roswell 26	CSU	Bogle Flat Spring	CRA	Replace with SUOR
Roswell 27	CSU	Preservation Spring	CRA	Replace with SUOR
Roswell 28	NSO	Cottonwood Spring and Draw	CRA	Replace with SUOR
Roswell 29	CSU	Owl Spring	CRA	Replace with SUOR
Roswell 30	NSO	Ben Slaughter Draw	CRA	Replace with SUOR

TABLE 21 (Continued)

COMPARISON OF CURRENT ROSWELL DISTRICT OIL AND GAS LEASING STIPULATIONS WITH PROPOSED LEASING STIPULATIONS

Current Stipulation	Type of Restriction	Feature	Area	Rescind Replace or Retain
Roswell 31	CSU	Blue Spring	CRA	Replace with SUOR
Roswell 32	NSO	Yeso Hills	CRA	Retain
Roswell 33	NSO	Critical Habitat for T&E Species (Bluntnose Shiner)	CRA	Replace with SUOR
Roswell 34	CSU	Critical Habitat for T&E Species (McKittrick ramshorn snail)	CRA	Replace with SUOR
Roswell 35	NSO	Historic Values-Potash Bull Wheel	CRA	Rescind
Roswell 36	Timing	Protection of Nesting Habitat (Herons)	CRA	Replace with SUOR
Roswell 37	NSO	Archaeological Values (Poco Site)	CRA	Retain
Roswell 38	CSU	Archaeological Values (Bear Grass Draw)	CRA	Rescind
Roswell 39	NSO	Pecos River/Canyon Complex ACEC	CRA	Retain
Roswell 40	CSU	Pecos River/Canyon Complex ACEC	CRA	Rescind
Roswell 41	NSO	Pecos River Corridor	CRA	Replace with SUOR
Roswell 42	CSU	Southern Gypsum Soil Area	CRA	Rescind
Roswell 43	NSO	Open Potash Mine Workings	CRA	Retain
Roswell 44	CSU	Wetland or Riparian Habitat	RRA	Replace with SUOR
Roswell 45	CSU	Pecos River Floodplain (Brantley Project)	CRA	Replace with SUOR
Roswell 46	Lease Notice	Cave/Karst Occurrence Area	RDO	Retain
Roswell 47	Lease Notice	T&E or Sensitive Species (Kuenzler cactus)	RRA	Retain
Roswell 48	CSU	Guadalupe Escarpment Habitat Management Area	CRA	Retain
Roswell 49	Lease Notice	Slope and Floodplains	CRA	Replace with SUOR

Key to Abbreviations:

NOL	Not Open to Leasing
NSO	No Surface Occupancy
CSU	Controlled Surface Use
SUOR	Surface Use and Occupancy Requirements
ACEC	Area of Critical Environmental Concern
CRA	Carlsbad Resource Area
RRA	Roswell Resource Area
RDO	Roswell District Office

CARLSBAD RESOURCE AREA

The BLM administers approximately 4,095,000 acres of federal oil and gas mineral estate in the Carlsbad Resource Area. Under this alternative:

Approximately 3,905,214 acres (95 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District." The total acreage includes controlled surface use restrictions and approximately 460,700 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions (see Tables 8 and 22, and Map 16).

TABLE 22
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
CARLSBAD RESOURCE AREA
ALTERNATIVE B

Areas[1/]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
City of Carlsbad Water Well Field	29,520		
East Guadalupe Escarpment Habitat Management Area		25,600	
Subtotal	29,520	25,600	
OTHER AGENCY MANAGEMENT:			
Air Base City, Hobbs Industrial Air Park	160		
Artesia Airport	200		
Carlsbad Airport	160		
Jal Airport	280		
Lincoln National Forest	N/A[2/]		
Subtotal	800		
Total	30,320	25,600	

[1/] Includes areas described in "Management Common to All Alternatives."

[2/] Amount of affected acreage not known.

Source: BLM files, 1994.

Approximately 62,247 acres (1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 8 and 23, and Map 16. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 127,539 acres (3 percent) would be closed to leasing to protect special resources or to support other public uses (Tables 8 and 24, and Map 16). In these areas, existing leases would continue to be developed on a case-by-case basis. However, once leases terminate, they would not be re-offered for leasing.

In the Carlsbad RMP, a number of areas were designated as special management areas. A variety of management practices were prescribed, including oil and gas stipulations. The use of the Surface Use and Occupancy Requirements, and reliance on off-road vehicle designations and visual resource management prescriptions established in the Carlsbad RMP make the continued use of oil and gas leasing stipulations unnecessary on the following areas:

Blue Spring
Bogle Flat Spring
Little McKittrick Draw HMA
Owl Spring
Preservation Spring
Southern Gypsum Soil Area
Lesser prairie chicken habitat areas
Heron rookeries
Ben Slaughter Draw
Bluntnose Shiner HMA
Cottonwood Spring
Fence Canyon Caves
Honest Injun Cave
KFF Caverns
Lost Cave
Pecos River Corridor
Yellow Jacket/Lair Caves

Existing oil and gas leasing stipulations for these areas would no longer be used under this alternative. The proposed changes are summarized in Table 21. Other management prescribed in the Carlsbad RMP for these areas would not change, and these areas would still be managed as special management areas. If needed, standardized lease notices would be used to provide information about OHV and VRM requirements to purchasers of leases.

The Maroon Cliffs Archeological District was established in the Carlsbad RMP. Under this alternative, the size of the area would increase from

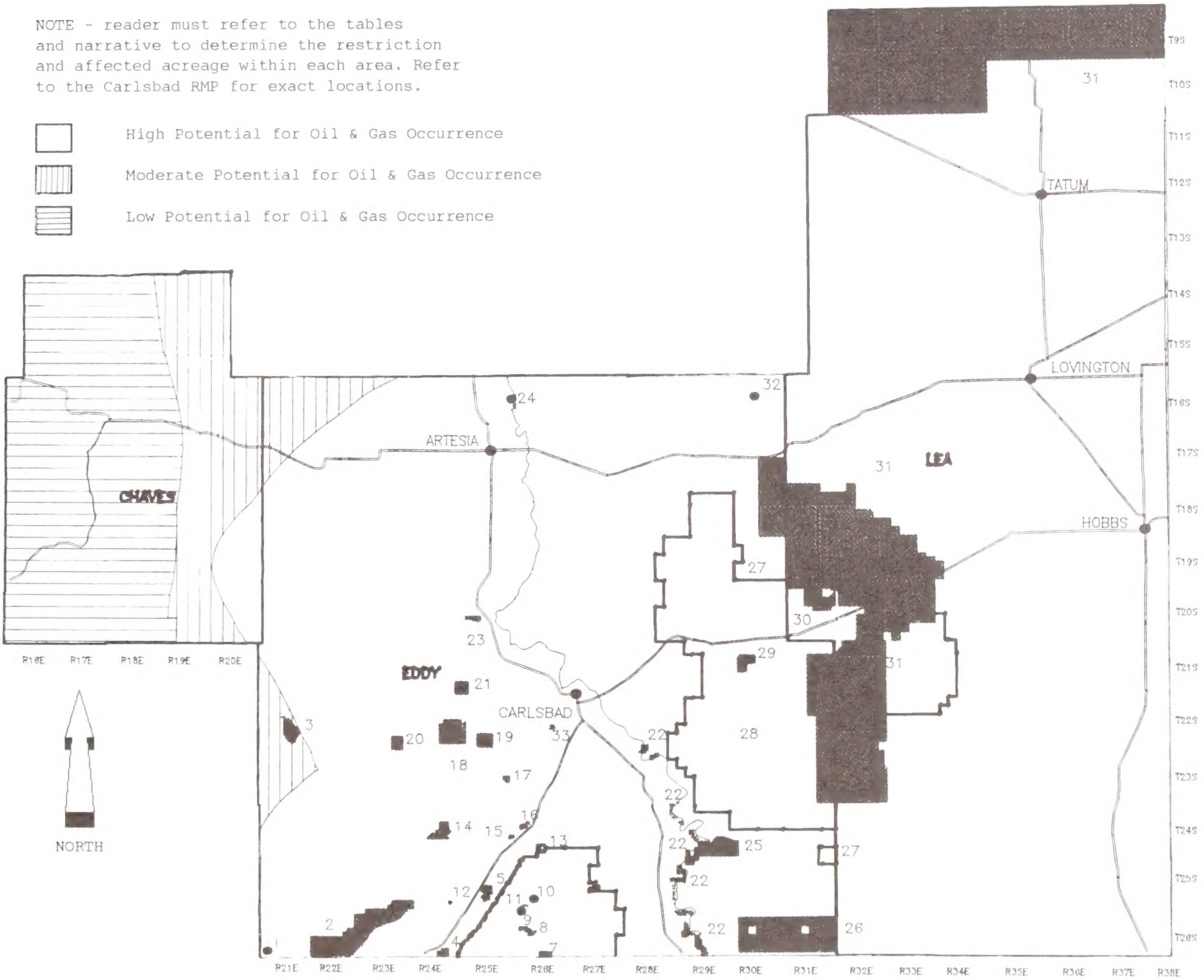
Areas Stipulated, by Alternative

	B	C	D	E
1 - McKittrick/Devil's Den WSAs	X	X	X	X
2 - Guadalupe Scenic Area/ Lonesome Ridge ACEC, WSA	X	X	X	X
3 - East Guadalupe HMA/ South Texas Hill RNA	X	X	X	X
4 - Yeso Hills	X	X	X	X
5 - Chosa Draw	X	X	X	X
6 - Southern Gypsum Soil Area	Not Applicable			
7 - Owl Spring	Not Applicable			
8 - CP Hill Buckwheat Area	X	X	X	X
9 - Ben Slaughter Draw	Not Applicable			
10 - Preservation Spring	Not Applicable			
11 - Cottonwood Spring	Not Applicable			
12 - Black River Buckwheat Area	X	X	X	X
13 - Blue Spring	Not Applicable			
14 - Mudgett's WSA/Dark Canyon EIS Area	X	X	X	X
15 - KFF Caverns	Not Applicable			
16 - Fence Canyon Caves	Not Applicable			
17 - Yellow Jacket/Lair Caves	Not Applicable			

	B	C	D	E
18 - McKittrick Hill Caves	X	X	X	X
19 - Honest Injun Cave	Not Applicable			
20 - Bogle Spring	Not Applicable			
21 - Little Walt Canyon	X	X	X	X
22 - Pecos River Corridor	Not Applicable			
23 - Seven Rivers Hills HMA	X	X	X	X
24 - Blunt Nose Shiner WHA	Not Applicable			
25 - Pecos River Canyons Complex ACEC	X		X	X
26 - Phantom Banks Heronries/Pope's Well	X	X	X	X
27 - Potash Area	X	X	X	X
28 - Tamarisk Flat Heronries	Not Applicable			
29 - Maroon Cliffs Arch. District X	X	X	X	
30 - Laguna Plata Arch. District	X	X	X	X
31 - Prairie Chicken Habitat	Not Applicable			
32 - Poco Site	X	X	X	X
33 - Lost Cave	Not Applicable			

NOTE - reader must refer to the tables and narrative to determine the restriction and affected acreage within each area. Refer to the Carlsbad RMP for exact locations.

☐	High Potential for Oil & Gas Occurrence
▥	Moderate Potential for Oil & Gas Occurrence
▤	Low Potential for Oil & Gas Occurrence



SCALE
1/2" = 9.5 Miles

MAP 16
OIL and GAS LEASING STIPULATION AREAS
Carlsbad Resource Area

TABLE 23
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
CARLSBAD RESOURCE AREA
ALTERNATIVE B

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
Black River Buckwheat Population Area	720		
Chosa Draw ACEC	2,820		
Laguna Plata Archaeological District	3,360		
Pecos River/Canyons ACEC/RNA	4,505[2]		
Poco Site	265		
Pope's Well	80		
Seven Rivers Hills HMA	540		
South Texas Hill Canyon RNA		3,600	
Yeso Hills RNA	557		
Subtotal	12,847	3,600	
OTHER AGENCY MANAGEMENT:			
Avalon Reservoir	14,800		
Brantley Lake State Park	10,000		
Brantley Reservoir	21,000		
Lincoln National Forest	N/A/[3]		
Subtotal	45,800		
Total	58,647	3,600	

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-1 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1] Includes areas described in "Management Common to All Alternatives."

[2] Acreage increased by 40 acres over Alternative A, to accommodate T&E species habitat.

[3] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 24
AREAS CLOSED TO FUTURE LEASING
CARLSBAD RESOURCE AREA
ALTERNATIVE B

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
Black River Buckwheat Population	720		
Cave Protection Zones (Dark Canyon)	10,120		
CP Hill Buckwheat Population	360		
Devils Den WSA	320		
Fence Canyon Caves	359		
Guadalupe Escarpment Scenic Area (zone 1)	11,700		
Honest Injun Cave	43		
KFF Caverns	130		
Little Walt Canyon Quarry Site	40		
Lonesome Ridge WSA[2]	3,505		
Lost Cave	30		
Maroon Cliffs Archaeological District	17,720		
McKittrick Canyon WSA	200		
McKittrick Hill Caves	5,240		
Mudgetts WSA[3]	1,060		
Yellow Jacket/Lair Caves	260		
Subtotal	51,807		
OTHER AGENCY MANAGEMENT:			
Carlsbad Caverns National Park/Wilderness	46,530		
Gnome Site	680		
Lincoln National Forest	26,282		
Living Desert State Park	1,520		
State Militia Site	720		
Subtotal	75,732		
Total	127,539		

---

[1] Includes areas described in "Management Common to all Alternatives."

[2] The 2,990-acre Lonesome Ridge ACEC is within the Lonesome Ridge WSA. The ACEC would remain closed to leasing even if the WSA is not designated as wilderness.

[3] Acreage shown is that part of the WSA outside the cave protection zones, which would become available for future leasing if the WSA is not designated as wilderness.

11,783 acres to 17,720 acres to include important areas of cultural resources. Management of oil and gas activity would be changed from no surface occupancy on 1,880 acres to no leasing on 17,720 acres. Other management prescriptions identified in the Carlsbad RMP would remain unchanged and would apply to the entire acreage of the archeological district. Refer to Table 24 and Maps 17 and 18. Map 17 represents the current configuration of the Archeological District and Map 18 shows the changes under Alternative B.

ROSWELL RESOURCE AREA

The BLM administers approximately 9,740,000 acres of federal oil and gas mineral estate in the Roswell Resource Area. Under this alternative:

Approximately 9,315,837 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District". This total includes controlled surface use restrictions and approximately 935,000 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. Refer to Tables 13 and 25, and Map 11.

TABLE 25
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas[1/]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
OTHER AGENCY MANAGEMENT:			
Santa Rosa Municipal Airport			320
Melrose Bombing Range, buffer area			1,000
Total			1,320

[1/] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

Approximately 22,034 (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 13 and 26, and Map 11. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 402,129 acres (4 percent) would be closed to leasing to protect resources or to support other public uses. Refer to Tables 13 and 27, and Map 11. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

Locatable Minerals

Goal: Continue to keep lands available to locatable minerals while maintaining important environmental values.

The areas summarized in Table 28 and shown on Map 9 would be withdrawn from entry or appropriation under the public land laws, including the general mining laws.

Solid Leasable Minerals

Goal: Continue to keep lands available to leasing while maintaining important environmental values.

Lands in the following area would remain closed to solid mineral leasing:

- Mathers Research Natural Area, 242 acres

Additional public lands that would be closed to solid mineral leasing are summarized in Table 29 and are shown on Map 19.

Saleable Minerals

Goal: Provide mineral materials to the public while maintaining the protection necessary to prevent adverse environmental impacts and to minimize impacts to public health and safety.

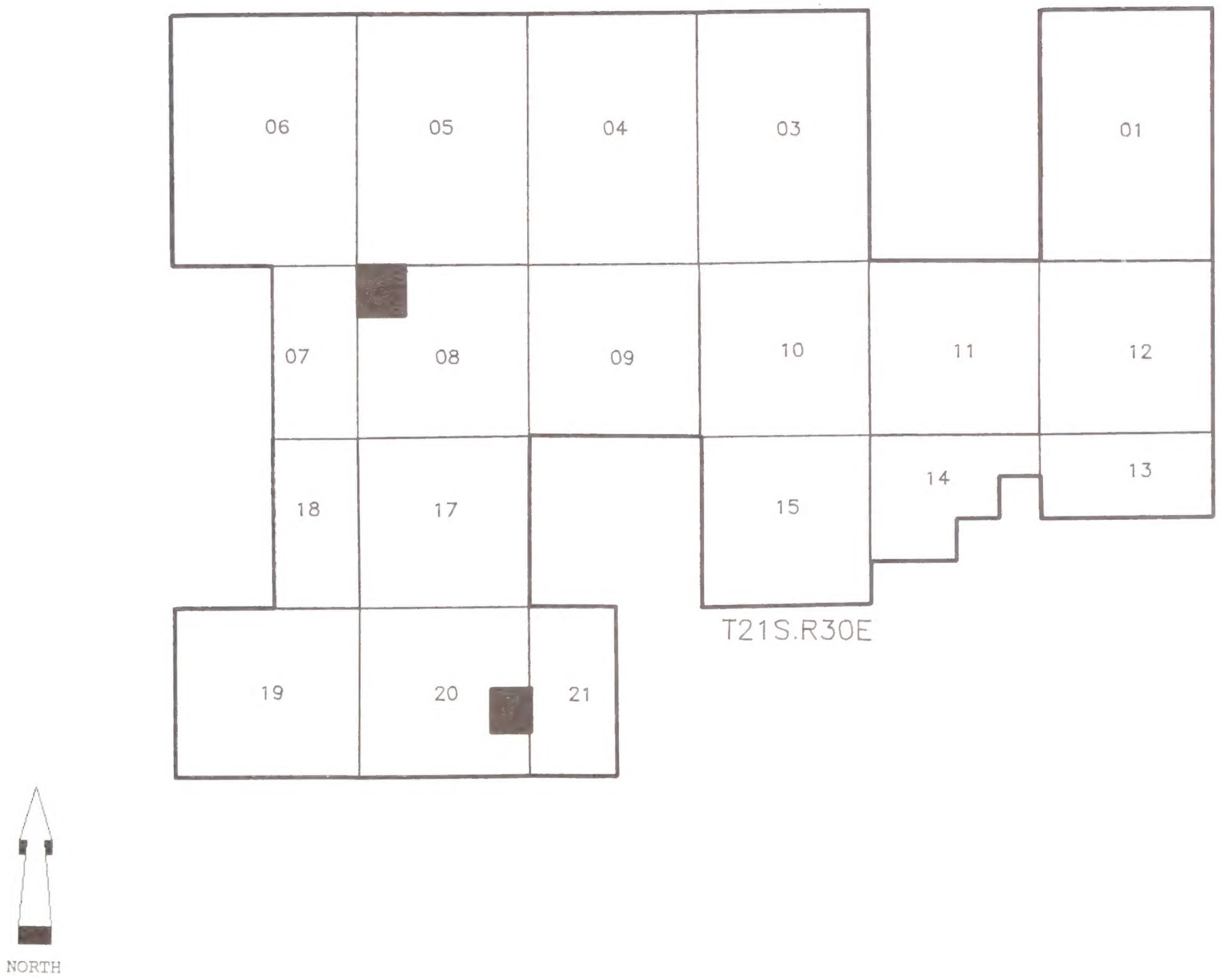
Mineral material pits no longer in use or selected pits in areas with a high density of pits would be reclaimed. Pits would be reclaimed to standards that would conform to, or improve, the condition of the surrounding ecosystem.

Oil and Gas Leasing Restrictions

☐ No Surface Occupancy (NSO)

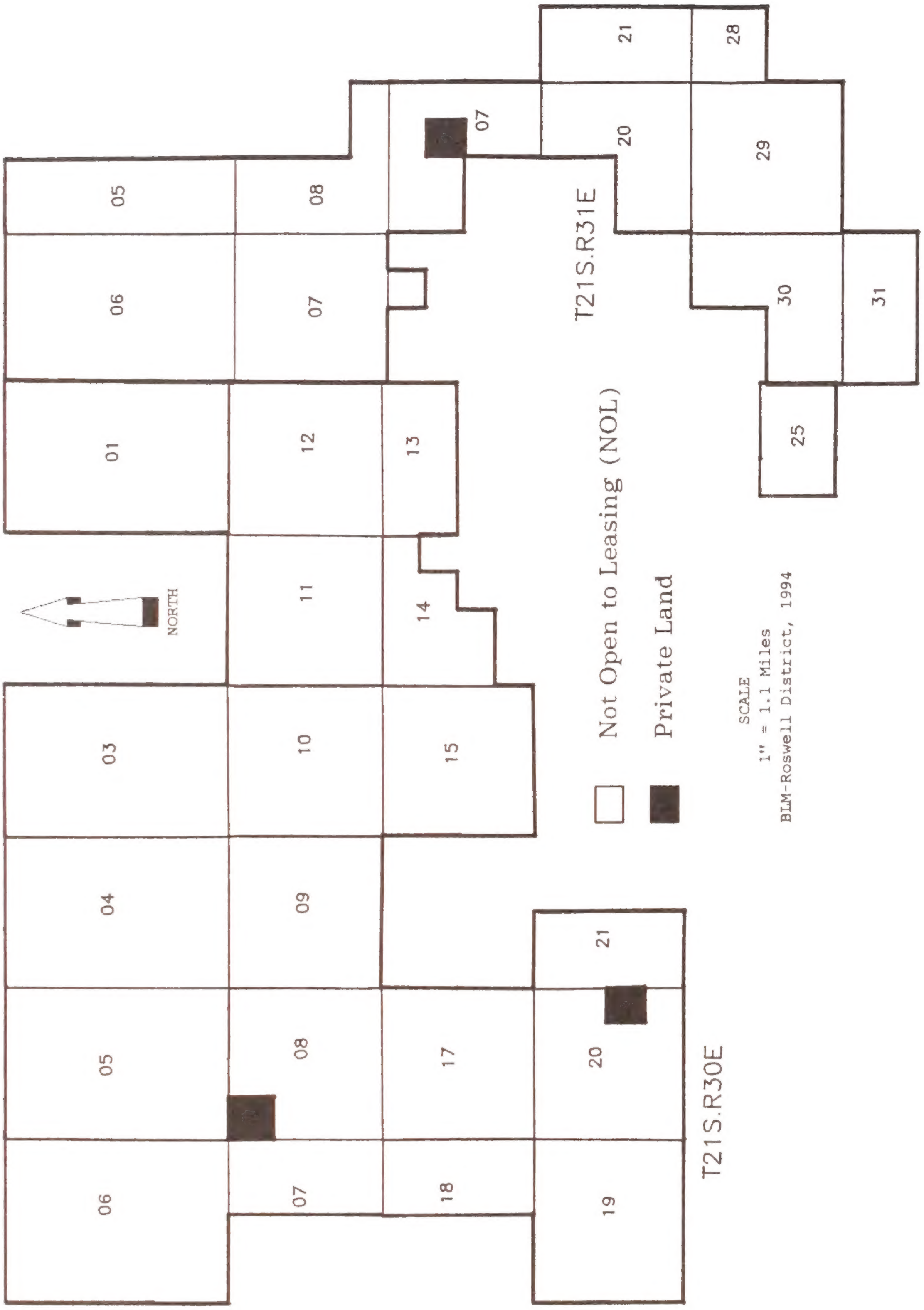
☐ Open For Leasing with Standard Stipulations

■ Private Land



SCALE
1" = 1.1 Miles
BLM-Roswell District, 1994

MAP 17
MAROON CLIFFS
ARCHAEOLOGICAL DISTRICT
ALTERNATIVES A and C
Carlsbad Resource Area



MAP 18
MAROON CLIFFS
ARCHAEOLOGICAL DISTRICT
ALTERNATIVE B
Carlsbad Resource Area

TABLE 26
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	 Moderate	 Low
BLM MANAGEMENT:			
Border Hill NNL		150	
Haystack Mountain OHV Area	3,500		
Mescalero Sand Dune North OHV Area	1,336		
Garnsey Bison Kill Site	520		
Valley of Fires Recreation Area		463	
Overflow Wetlands ACEC	2,300		
Billy the Kid Recreation Site	80		
North Pecos River ACEC	2,120		
Subtotal	9,856	613	
OTHER AGENCY MANAGEMENT:			
Cibola National Forest			N/A[2]
Fort Sumner Project and Sumner Lake State Park	11,240		
Lincoln National Forest			N/A[2]
Tucumcari Project	7		
Ute Lake State Park	325		
Subtotal	11,572		
Total	21,428	613	

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-2 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1] Includes areas described in "Management Common to All Alternatives."

[2] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 27
AREAS CLOSED TO FUTURE LEASING
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Alleged UFO Crash Sites[2]	1,120	2,560	
Carrizozo Lava Flow and Little Black Peak WSAs		25,312	
Cocklebur Lakes National Register District	2,360		
Fort Stanton ACEC			27,622
Haystack Butte National Register District	3,400		
Mathers Research Natural Area	242		
Mescalero Sands ACEC	7,931		
North Pecos River ACEC	2,080		
Overflow Wetlands ACEC	700		
Roswell Cave Complex ACEC	12,654	1,600	640
Subtotal	30,487	26,912	30,822
OTHER AGENCY MANAGEMENT:			
Bitter Lake National Wildlife Refuge	6,320		
Bottomless Lakes State Park	460		
Cibola National Forest			19,178
Grulla National Wildlife Refuge	69		
Lincoln National Forest			99,171
Melrose Bombing Range, core area	6,714		
Salt Creek Wilderness	1,240		
White Sands Missile Range		180,756	
Subtotal	14,803	180,756	118,349
Total	45,290	207,668	149,171

[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

Source: BLM files, 1994.

TABLE 28
AREAS WITHDRAWN FROM MINERAL ENTRY
ROSWELL RESOURCE AREA
ALTERNATIVE B

Area[1]	Estimated Mineral Acreage
BLM MANAGEMENT:	
Alleged UFO Crash Sites[2]	3,680
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area (staging area)	160
Mathers Research Natural Area	242
Mescalero Sands ACEC[3]	7,931
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	3,000
Roswell Cave Complex ACEC[4]	14,894
Spring and Seep Areas	950
Valley of Fires Recreation Area	463
Subtotal	95,884
OTHER AGENCY MANAGEMENT:	
Blackwater Draw Archaeological Site	711
Canal Right-of-Way (NM 21834)	7
Melrose Bombing Range, core area	6,714
Nike Hercules Defense Site	325
NM Army National Guard Training Site	53
Fort Sumner Dam and Sumner Lake State Park	8,123
Tucumcari Project, Conchas Canal (NM 52398)	7
Two Rivers Reservoir Project	2,590
Subtotal	18,530
Total	114,414

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[1] Includes areas described under "Management Common to All Alternatives."

[2] Two alleged sites.

[3] May include as many as 6,617 acres originally in the Mescalero Sands Recreation Complex.

[4] Includes original 40-acre withdrawal on Torgac Cave.

Source: BLM files, 1996.

TABLE 29
AREAS CLOSED TO SOLID MINERAL LEASING
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas[1]	Estimated Mineral Acres
Alleged UFO Crash Sites[2]	3,680
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	3,520
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,931
Mescalero Sands North Dune OHV Area	610
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	3,000
Pecos River Floodplain in Chaves County	2,290
Roswell Cave Complex ACEC	14,894
Valley of Fires Recreation Area	463
Total	101,194

[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

Source: BLM files, 1994.

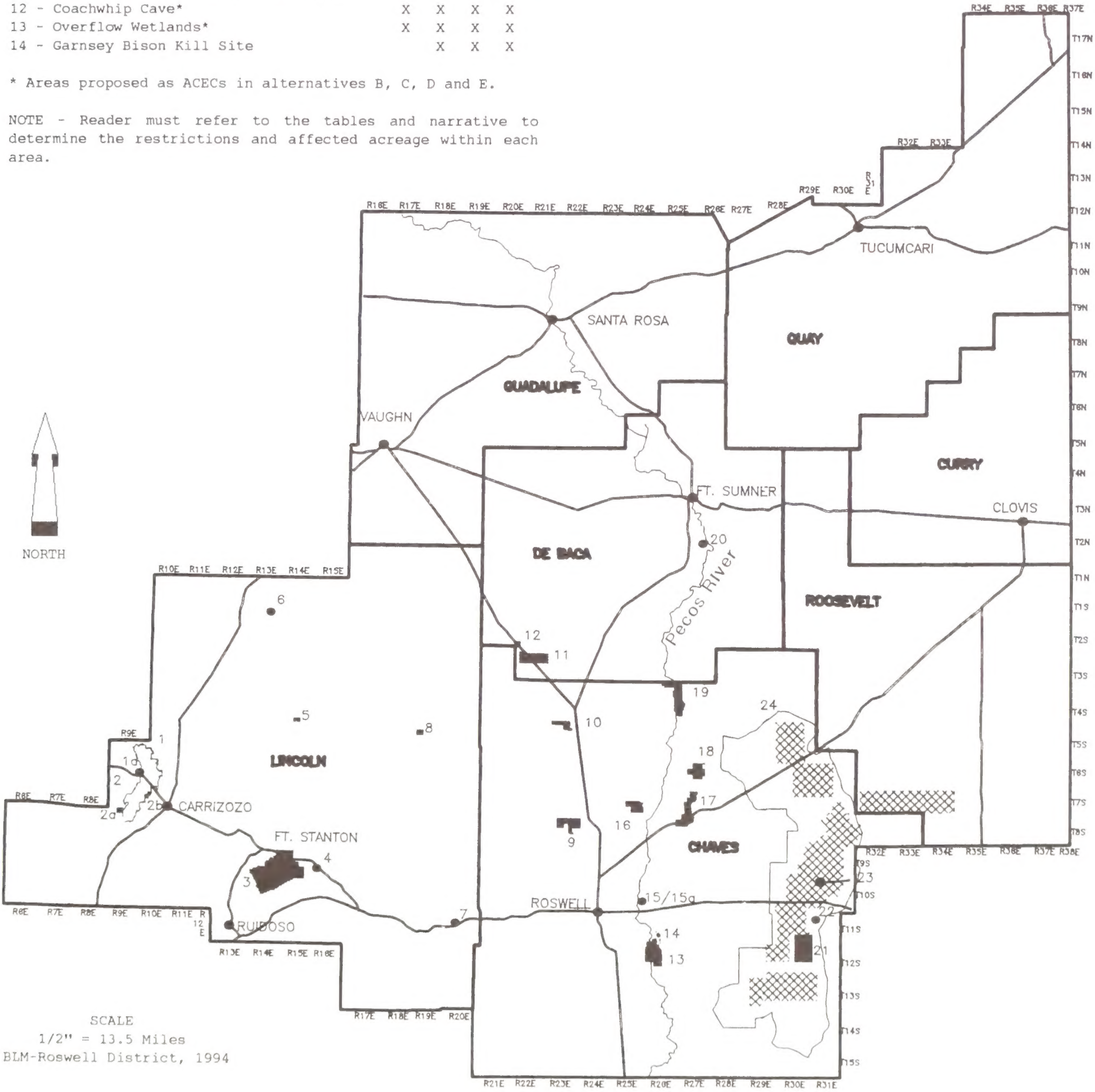
Areas Closed, by Alternative

	A	B	C	D	E
1 - Little Black Peak WSA		X	X	X	X
1a - Millrace Cave*		X	X	X	X
2 - Carrizozo Lava Flow WSA		X	X	X	X
2a - Crockett Cave*		X	X	X	X
2b - Valley of Fires Recreation Area		X	X	X	X
3 - Fort Stanton*	X	X	X	X	X
4 - Rio Bonito Acquired Lands	Not Applicable				
5 - Zia Christine Cave*		X	X	X	X
6 - Alleged UFO Crash Sites		X	X	X	X
7 - Border Hill NNL		X	X	X	X
8 - Torgac Cave*	X	X	X	X	X
9 - Angora-Corn Cave*		X	X	X	X
10 - Martin-Antelope GYP Cave*		X	X	X	X
11 - Crystal Caverns/Devil's Well Caves*		X	X	X	X
12 - Coachwhip Cave*		X	X	X	X
13 - Overflow Wetlands*		X	X	X	X
14 - Garnsey Bison Kill Site			X	X	X

	A	B	C	D	E
15 - Bat Hole Cave*		X	X	X	X
15a - Comanche Hill	Not Applicable				
16 - Cocklebur Lakes Arch. District		X	X	X	X
17 - Haystack Mountain OHV Area		X	X	X	X
18 - Haystack Butte Arch. District		X	X	X	X
19 - North Pecos River*		X	X	X	X
20 - Billy the Kid Recreation Site			X	X	X
21 - Mescalero Sands OHV Area		X	X	X	X
22 - Mescalero Sands*		X	X	X	X
23 - Mathers RNA	X	X	X	X	X
24 - Caprock WHA	Not Applicable				
▨ - Core Prairie Chicken Habitat	Not Applicable				

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the restrictions and affected acreage within each area.



MAP 19

AREAS CLOSED TO LEASING OF SOLID MINERALS

Roswell Resource Area

TABLE 30
AREAS CLOSED TO THE DISPOSAL OF MINERAL MATERIALS
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas	Estimated Mineral Acres
Alleged UFO Crash Sites[1]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	25,951
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	3,500
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,931
Mescalero Sands North Dune OHV Area	610
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	3,000
Roswell Cave Complex ACEC	14,894
Valley of Fires Recreation Area	463
Total	97,293

[1] Two alleged sites.

Source: BLM files, 1994.

The areas that would be closed to mineral material disposals to preclude surface disturbance are summarized in Table 30 and are shown on Map 20.

LANDS AND REALTY MANAGEMENT

Goal: Manage the public lands to support the goals and objectives of other resource programs, to respond to public demand for land use authorizations, and to acquire administrative and public access where necessary.

Utility and Transportation System

Public lands in the resource area would be made available for rights-of-way, permits, and leases. In defined exclusion and avoidance areas, public lands would be open to the consideration of granting rights-of-way under strict guidelines that could limit or eliminate opportunities for locating rights-of-way.

Areas proposed for exclusion of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 31 and are shown on Map 12.

Lands acquired as habitat for Special Status Species or acquired for wetland/riparian values would be added to the right-of-way exclusion area for major projects. Exceptions would be considered in exclusion zones on a case-by-case basis for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines.

Areas proposed for avoidance of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 32 and are shown on Map 21. Rights-of-way for major projects and for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in avoidance zones on a case-by-case basis.

No additional rights-of-way corridors would be designated.

See management common to all alternatives for a description of the existing corridor.

Acquisition

As many as 3,000 acres of private or state lands along the Rio Bonito would be considered for acquisition to enhance management of the Fort Stanton area.

Over the life of the plan, the acquisition of an estimated 95,600 acres of non-federal lands or interests in non-federal lands, in addition to the Rio Bonito lands, would be considered on a case-by-case basis to achieve management objectives. Refer to Appendix 8 for acquisition criteria. Any lands acquired would be managed according to the management prescriptions in this alternative. The areas summarized in Table 33, shown on Map 13, and described in Appendix 9 are currently identified as being suitable for consideration for acquisition, as opportunities become available.

Easements would be acquired to provide access to public lands for recreation, wildlife, range, cultural/historical, mineral, ACEC, special management area and other resource needs, as opportunities arise. Criteria for the acquisition of easements are described in Appendix 8. Easements are needed in the following areas:

- Overflow Wetlands WHA
- Crockett Cave
- Crystal Caverns-Devil's Well Cave
- Millrace Cave
- Little Black Peak Cinder Cone east access
- Little Black Peak Cinder Cone west access
- Carrizozo Lava Flow WSA lower windmill east access
- Mescalero Sands ACEC east access
- Mescalero Sands ACEC west access

Disposal

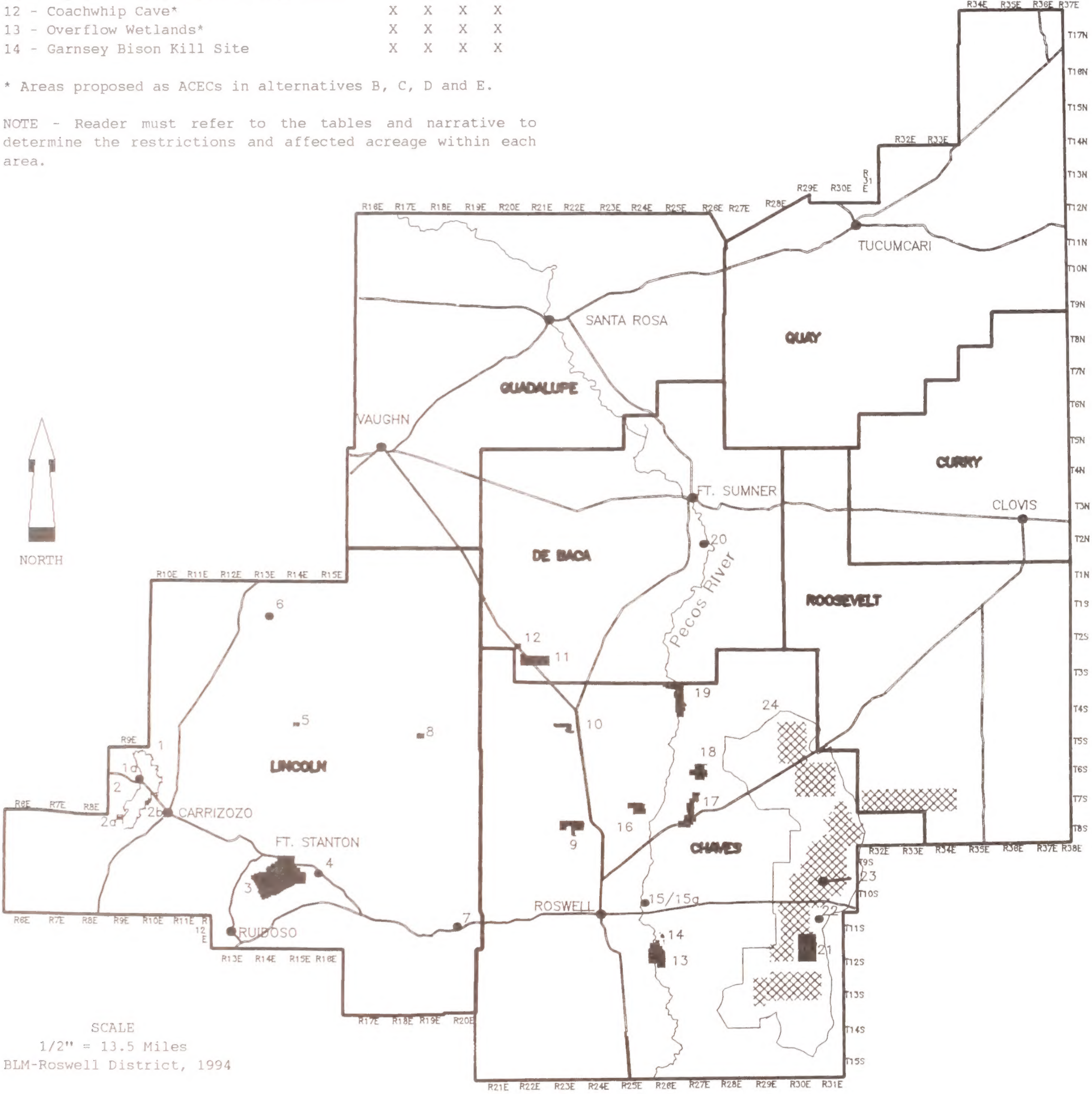
The disposal of as many as 150,000 acres of public lands (e.g., transfer from the administration of the

Areas Closed, by Alternative

	A	B	C	D	E
1 - Little Black Peak WSA		X	X	X	X
1a - Millrace Cave*		X	X	X	X
2 - Carrizozo Lava Flow WSA		X	X	X	X
2a - Crockett Cave*		X	X	X	X
2b - Valley of Fires Recreation Area		X	X	X	X
3 - Fort Stanton*	X	X			
4 - Rio Bonito Acquired Lands	Not Applicable				
5 - Zia Christine Cave*		X	X	X	X
6 - Alleged UFO Crash Sites		X	X	X	X
7 - Border Hill NNL		X	X	X	X
8 - Torgac Cave*	X	X	X	X	X
9 - Angora-Corn Cave*		X	X	X	X
10 - Martin-Antelope GYP Cave*		X	X	X	X
11 - Crystal Caverns/Devil's Well Caves*			X	X	XX
12 - Coachwhip Cave*		X	X	X	X
13 - Overflow Wetlands*		X	X	X	X
14 - Garnsey Bison Kill Site		X	X	X	X
15 - Bat Hole Cave*		X	X	X	X
15a- Comanche Hill	Not Applicable				
16 - Cocklebur Lakes Arch. District		X	X	X	X
17 - Haystack Mountain OHV Area		X	X	X	X
18 - Haystack Butte Arch. District		X	X	X	X
19 - North Pecos River*		X	X	X	X
20 - Billy the Kid Recreation Area		X	X	X	X
21 - Mescalero Sands OHV Area		X	X	X	X
22 - Mescalero Sands*		X	X	X	X
23 - Mathers RNA	X	X	X	X	X
24 - Caprock WHA	Not Applicable				
▨ - Prairie Chicken Core Habitat	Not Applicable				

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the restrictions and affected acreage within each area.


NORTH
QUAY
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GUADALUPE
DE BACA
ROOSEVELT
LINCOLN
CHAVES
TUCUMCARI
SANTA ROSA
VAUGHN
FT. SUMNER
CLOVIS
CARRIZOZO
FT. STANTON
RUIDOSO
ROSWELL
Pecos River
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R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 20

AREAS CLOSED TO DISPOSAL OF MINERAL MATERIALS

Roswell Resource Area

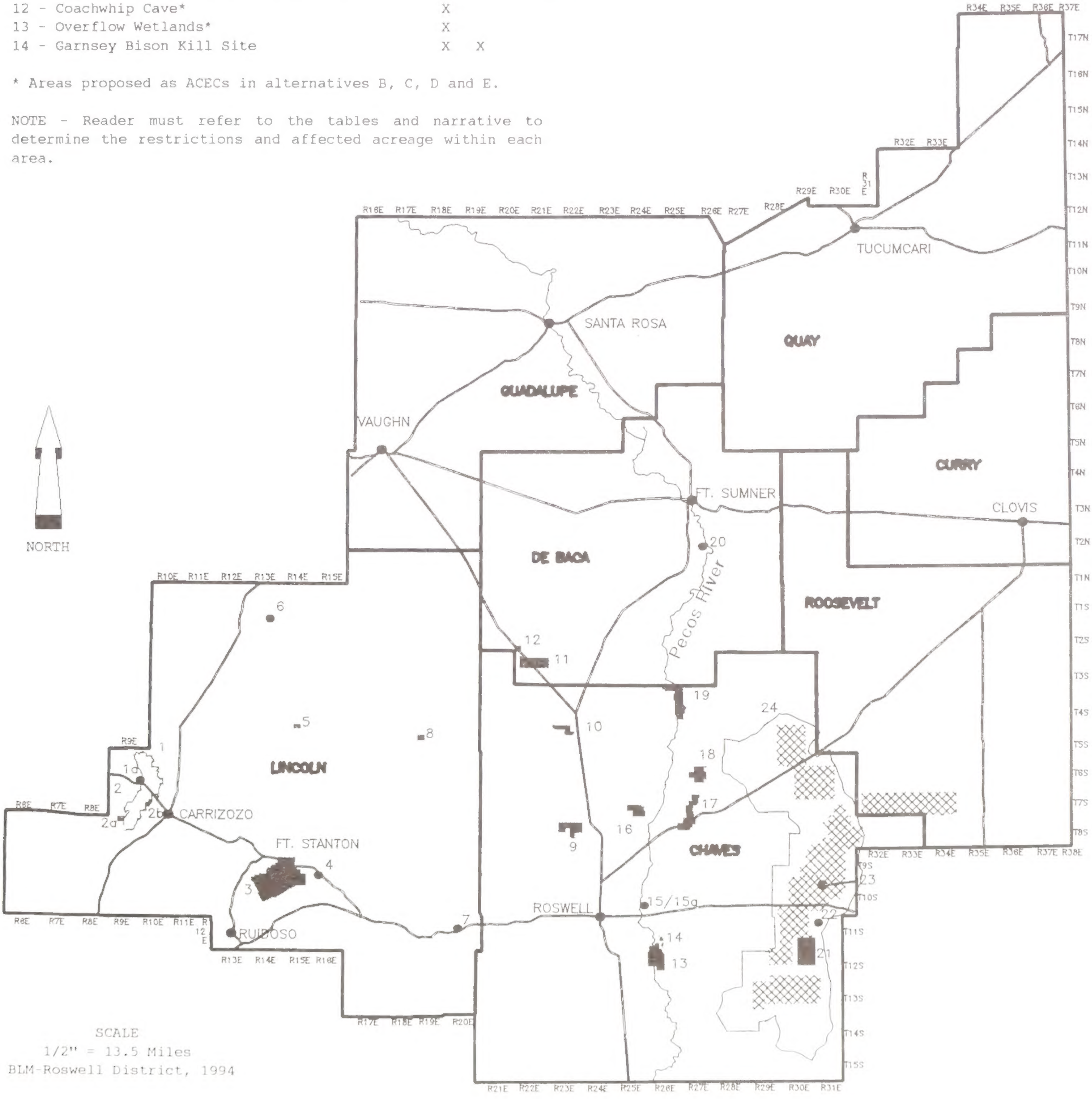
Rights-of-Way Avoidance Areas, by Alternative

	A	B	C	D	E
1 - Little Black Peak WSA	Not Applicable				
1a - Millrace Cave*			X		
2 - Carrizozo Lava Flow WSA	Not Applicable				
2a - Crockett Cave*			X		
2b - Valley of Fires Recreation Area	Not Applicable				
3 - Fort Stanton*			X		
4 - Rio Bonito Acquired Lands	Not Applicable				
5 - Zia Christine Cave*			X		
6 - Alleged UFO Crash Sites	Not Applicable				
7 - Border Hill NNL	Not Applicable				
8 - Torgac Cave*			X		
9 - Angora-Corn Cave*			X		
10 - Martin-Antelope GYP Cave*			X		
11 - Crystal Caverns/Devil's Well Caves*			X		
12 - Coachwhip Cave*			X		
13 - Overflow Wetlands*			X		
14 - Garnsey Bison Kill Site			X	X	

	A	B	C	D	E
15 - Bat Hole Cave*			X		
15a- Comanche Hill	Not Applicable				
16 - Cocklebur Lakes Arch. District			X		
17 - Haystack Mountain OHV Area			X	X	X
18 - Haystack Butte Arch. District			X		
19 - North Pecos River*			X		X
20 - Billy the Kid Recreation Area	Not Applicable				
21 - Mescalero Sands OHV Area		X	X	X	
22 - Mescalero Sands*			X		
23 - Mathers RNA	Not Applicable				
24 - Caprock WHA		X			
▨ - Core Prairie Chicken Habitat			X	X	X

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the restrictions and affected acreage within each area.



NORTH
TUCUMCARI
SANTA ROSA
QUAY
GUADALUPE
VAUGHN
CURRY
FT. SUMNER
CLOVIS
DE BACA
Pecos River
ROOSEVELT
LINCOLN
CARRIZOZO
FT. STANTON
CHAVES
ROSWELL
RUIDOSO
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R29E R30E R31E
R32E R33E
R34E R35E R36E R37E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
R10E R11E R12E R13E R14E R15E
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R32E R33E R34E R35E R36E R37E R38E

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 21

RIGHTS-OF-WAY AVOIDANCE AREAS

Roswell Resource Area

BLM to other federal agencies, or local or state governments, or disposal through methods such as exchange, public sale, State indemnity selection, or Recreation and Public Purposes leases or patents) would be considered on a case-by-case basis. Appendix 10 includes a list of tracts totalling 103,676 acres already identified that would be suitable for consideration for disposal. Prior to any disposal action, these lands, and any others proposed for disposal, would be evaluated for compliance with the disposal criteria that are also listed in Appendix 8.

LIVESTOCK GRAZING MANAGEMENT

Goal: Provide effective and efficient management of allotments to maintain, improve, and monitor range conditions.

Rangeland improvements and vegetation treatments would continue to be implemented to improve or maintain forage production and range condition, in an effort to achieve the Desired Plant Community. Wildlife habitat and watershed management needs would be emphasized.

The following are the types and estimates, based projected demand, of new projects that would be implemented over 20 years under this alternative. Funding priority would be given to "I" category allotments covered by allotment management plans.

- 150 miles of water pipeline
- 150 water development projects, including wells, storages, troughs, or dirt tanks.
- 75 miles of fence construction.

Specific grazing systems would be developed, in coordination with permittees, on allotments in the Caprock Wildlife Habitat Area (WHA) to meet DPC objectives.

The stocking rate of sheep within the Macho WHA would not exceed an average of 50 sheep per section per allotment over the course of the grazing year.

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan. On other acquired lands, establishing grazing preference would be considered on a case-by-case basis, depending on the purpose for which the lands were acquired and the management objectives for those lands.

Management proposed in this alternative would result in a reduction in the amount of livestock grazing authorized on the public lands. Table 19 summarizes estimated AUM (animal unit month) reductions that may result from certain management actions.

Livestock grazing would be excluded from developed recreation facilities and within fenced exclosures around caves to preclude conflicts with recreationists, to promote visitor safety and health, and to reduce the cost of facility maintenance.

Livestock stocking rates would be adjusted under certain circumstances to reduce or eliminate conflicts with recreation use and development, and to reduce the cost of facility maintenance. Adjustments would include excluding livestock from developed recreation facilities and within fenced exclosures around caves.

TABLE 31
RIGHTS-OF-WAY EXCLUSION AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas	Estimated Acres
Alleged UFO Crash Sites[1/]	3,680
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Core Prairie Chicken Habitat Areas	245,000
Fort Stanton ACEC	24,630
Garnsey Bison Kill Site	360
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area (applies to overhead power and telephone lines)	3,500
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,888
North Pecos River ACEC	3,360
Overflow Wetlands ACEC	3,000
Rio Bonito[2/]	2,000
Roswell Cave Complex ACEC	14,894
U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)	76
Valley of Fires Recreation Area	463
Total	340,955

[1/] Two alleged sites.

[2/] Includes the Rio Bonito Waterfall, lands along the Rio Boito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

TABLE 32
RIGHTS-OF-WAY AVOIDANCE AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas	Estimated Acres
Caprock WHA Outside of Core Prairie Chicken Habitat	310,223
Mescalero Sand Dunes North OHV area (applies to overhead power and telephone lines)	610
Total	310,833

Source: BLM files, 1994.

TABLE 33
LANDS CONSIDERED SUITABLE FOR POTENTIAL ACQUISITION
ROSWELL RESOURCE AREA
ALTERNATIVE B

Areas[1]	Private	State
Caprock WHA Expansion	8,480	18,969
Carrizozo Lava Flow and Little Black Peak WSAs	5,512	4,321
Cedar Hills and Pecos River Deer Management Areas		3,521
Fort Stanton Area		1,320
Garnsey Bison Kill Site	200	320
Haystack Butte Archaeological District	40	640
Overflow Wetlands ACEC	2,100	1,720
Mescalero Sands ACEC	320	1,800
North Pecos River ACEC	1,880	1,160
Pecos River Floodplains	2,955	1,440
Playa Lakes	1,051	590
Rio Bonito[2]	1,018	1,982
Roswell Cave Complex ACEC		4,920
Valley of Fires Recreation Area	493	19
Total	28,969	37,802

[1] Includes areas described in "Management Common to All Alternatives."

[2] Includes the Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

VEGETATION MANAGEMENT

Goal: Manage resources to maintain or improve vegetation with the emphasis on watershed protection and forage for wildlife.

General management objectives, the composition of plant communities identified as a desired plant community (DPC), and practices proposed for use in meeting the management objectives and DPC are described below. In all cases, an ecological site must be capable of attaining the DPC through natural succession, management action, or both. Refer to Appendix 11 for more information on plant communities and the development of the DPC process.

Watershed, wildlife and livestock management objectives for each community, except the Mixed Shrub Malpais Community, are to improve vegetation composition and production in areas that currently do not meet the vegetation condition objectives and maintain vegetation condition in areas that do. The management objectives for the Mixed Shrub Malpais Community are to maintain the current vegetation composition and production levels.

The standard practices that could be employed to meet a DPC would be based on thresholds and vegetation condition objectives described below for each community type. The specific practices to be used and the numbers of acres affected would be determined during activity planning, based on the results of resource monitoring. During activity planning, specific resource condition objectives would be developed for a distinct area (e.g., an allotment) based on the planned use of the area and the more general vegetation condition objectives developed in this land use plan.

The standard practices that would be employed to meet management objectives in each community are:

- Utilization levels not exceeding 40 percent of annual plant production, with the exception of the Rio Bonito acquired lands. Utilization levels would be determined prior to green-up, and measured on key forage species.
- Projects such as fences, water developments, erosion control structures, reseedings, or vegetative sales.
- Grazing treatments such as changes in season of use, class of livestock, or stocking rates.
- Vegetation treatments, including, prescribed fire or prescribed natural fire; fuelwood sales; and biological or mechanical controls. Chemical controls would not be used to alter or kill vegetation.

Grassland Community

Refer to Table 34 for Grassland Community vegetation condition objectives.

Vegetation treatments to influence DPC in the grassland community would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Catclaw	50 plants/acre
Creosote	20% of the vegetative canopy
Lechuguilla	20% of the vegetative canopy
Tarbush	20% of the vegetative canopy
Broom Snakeweed	25% by weight of vegetative production
Pinon/juniper	50 trees/acre

Shinnery Oak-Dune Community

Refer to Table 35 for Shinnery Oak-Dune Community vegetation condition objectives.

The SOD community type on 91 of the 242 acres in the Mathers Research Natural Area would not be grazed by livestock. The entire Natural Area would be used for wildlife population and habitat studies. Those studies may entail vegetative treatments and DPC may not be reached. Likewise, DPC may not be reached in the Mescalero Sands North Dune OHV Recreation Area, which would be managed primarily for off-road vehicle recreational activities, and in the proposed Mescalero Sands ACEC, which would be managed according to the prescriptions for the ACEC.

Vegetation treatments to influence DPC in the shinnery oak-dune community would be considered at the following threshold:

Mesquite	50 plants/acre

Constraints on treatments in the shinnery oak-dune community are:

- Treatments may be conducted to achieve DPC objectives in areas that are not considered suitable or occupied habitat for the dune sagebrush lizard, or for other special status species that may be identified.

Mixed Shrub Malpais Community

Watershed, wildlife and livestock management objectives for the mixed shrub malpais community are to maintain the current vegetation composition and production levels.

Refer to Table 36 for Mixed Shrub Malpais Community vegetation condition objectives.

Constraints on the management of vegetation in the mixed shrub malpais community are:

- No changes would be made in current livestock management.
- No projects would be constructed in the Malpais.

Pinon-Juniper Grassland Community

Refer to Table 37 for Pinon-Juniper Grassland Community vegetation condition objectives.

A mosaic of different vegetation structure and composition is needed to enhance wildlife habitat in this community type. Primary management emphasis would be on the desirable shrub component to improve mule deer, elk, Mearn's quail, and Kuenzler cactus habitats.

Vegetation treatments to influence DPC would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Broom Snakeweed	25% by weight of vegetative production
Pinon/juniper	150 trees/acre

Constraints on treatments in the pinon-juniper community are:

- Removal of trees would be done to create edge and mosaic patterns.

Mixed Desert Shrub Community

Refer to Table 38 for Mixed Desert Shrub Community vegetation condition objectives.

Vegetation treatments to influence DPC in the mixed desert shrub community would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Catclaw	50 plants/acre
Creosote	20% of the vegetative canopy
Lechuguilla	20% of the vegetative canopy
Tarbush	20% of the vegetative canopy
Broom Snakeweed	25% by weight of vegetative production
Pinon/juniper	50 trees per acre

Drainages, Draws and Canyons Community

Refer to Table 39 for Drainages, Draws and Canyons Community vegetation condition objectives.

Vegetation treatments to influence DPC in the drainages, draws and canyons community would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Catclaw	50 plants/acre
Creosote	20% of the vegetative canopy
Lechuguilla	20% of the vegetative canopy
Tarbush	20% of the vegetative canopy
Broom Snakeweed	25% by weight of vegetative production

Constraints on treatments in the drainages, draws and canyons community are:

- Browse species would be protected.
- Riparian-wetland vegetation would be protected by methods such as developing riparian pastures, establishing upland waters, and conducting salt cedar control.

Riparian-Wetlands Community

There is no current management objective based on Ecological Range Site Goals for the riparian-wetlands community. Riparian management objectives require more specific plant community prescriptions to meet these goals. Current SCS range site descriptions do not adequately describe potential plant communities for riparian-wetland areas.

Rio Bonito Acquired Lands

Vegetation management on the acquired Rio Bonito lands would be developed under specific Ecological Range Site Goals which would include agricultural crops established on existing tillable acreage using water rights obtained with the acreage. Crops, including apple orchards, and tame pasture species such as hay, winterwheat, fescues, and orchard grass, would be selected for use by wildlife.

TABLE 34
VEGETATION MANAGEMENT - GRASSLAND COMMUNITY
ALTERNATIVES B, C, and D

	Vegetative Community Objectives % Cover	Vegetative Cover By % Composition	% Composition By Weight
Grass/Forbs	15-52		
Grasses		30-45	60-90
Forbs		10-15	10-30
Shrubs/Trees	3-12		
Shrubs		1-10	15-25
Trees			1-10
Bare Ground	14-60		
Small Rock/Large Rock	0-30		
Litter	8-44		

Note: Vegetation composition in any given pasture must include a minimum of 10 genera of fall forbs preferred by pronghorn antelope, under Alternatives B and E, but not for Alternatives C and D.

Source: BLM files, 1994.

TABLE 35
VEGETATION MANAGEMENT - SHINNERY OAK-DUNE COMMUNITY
ALTERNATIVES B, C, and D

	Vegetative Community Objectives % Cover	Vegetative Cover By % Composition	%Composition By Weight
Grass/Forbs	16-40		
Grasses		50-70	60-80
Forbs		10-15	10-30
Shrubs/Trees	3-17		
Shrubs		25-40	15-25
Trees			1-10
Bare Ground	5-20		
Small Rock/Large Rock	0-01		
Litter	25-70		

Source: BLM files, 1994.

TABLE 36
VEGETATION MANAGEMENT - MIXED SHRUB MALPAIS COMMUNITY
ALTERNATIVES B, C, and D

	Existing % Cover	Existing Composition By % Weight
Grass/Forbs	20	
Grasses		80
Forbs		3
Shrubs/Trees	4	
Shrubs		16
Trees	0	1-10
Bare Ground	23	
Small Rock/Large Rock	41	
Litter	12	

Source: BLM files, 1994

TABLE 37
VEGETATION MANAGEMENT - PINON-JUNIPER GRASSLAND COMMUNITY
ALTERNATIVES B, C, and D

	Vegetative Community Objectives		
	% Cover	Vegetative Cover By % Composition	% Composition By Weight
Grass/Forbs	15-35		
Grasses		30-40	50-85
Forbs		3-10	5-15
Shrubs/Trees	10-25		
Shrubs		20-35	15-25
Trees		30-40	3-10
Bare Ground	12-24		
Small Rock/Large Rock	5-35		
Litter	10-20		

Source: BLM files, 1994.

TABLE 38
VEGETATION MANAGEMENT - MIXED DESERT SHRUB COMMUNITY
ALTERNATIVES B, C, and D

	Vegetative Community Objectives	
	% Cover	% Composition By Weight
Grass/Forbs	11-28	
Grasses		50-80
Forbs		10-20
Shrubs/Trees	6-15	
Shrubs		10-30
Trees		1-10
Bare Ground	10-40	
Small Rock/Large Rock	15-35	
Litter	1-12	

Source: BLM files, 1994.

TABLE 39
VEGETATION MANAGEMENT - DRAINAGES, DRAWS, AND CANYONS COMMUNITY
ALTERNATIVES B, C, and D

	Vegetative Community Objectives	
	% Cover	% Composition By Weight
Grass/Forbs	15-45	
Grasses		50-80
Forbs		10-20
Shrubs/Trees	3-20	
Shrubs		10-30
Trees		1-10
Bare Ground	0-60	
Small Rock/Large Rock	0-40	
Litter	4-43	

Source: BLM files, 1994

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan.

If livestock grazing is allowed, excess forage could be used for limited grazing in late winter or early spring. Livestock grazing on the Rio Bonito acquired lands would be held to a level at which 45 percent of current year's forage growth would remain after all uses.

CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT

Goal: Increase the protection of, and knowledge derived from, significant archeological and historic properties known now and those discovered in the future.

Cultural sites would be managed to preserve a higher percentage of the total number of sites with a secondary emphasis on studying them for their information.

Approximately 20 percent of the recorded archeological sites in the resource area would be managed for conservation. The management objective for conservation would be to preserve existing archeological values. This would be achieved by protecting sites from damage by natural processes such as erosion and from man-caused damage such as illegal artifact collecting and from legally authorized surface disturbing activities. The Paleoindian sites, such as those in the Haystack Butte area would fall into this category.

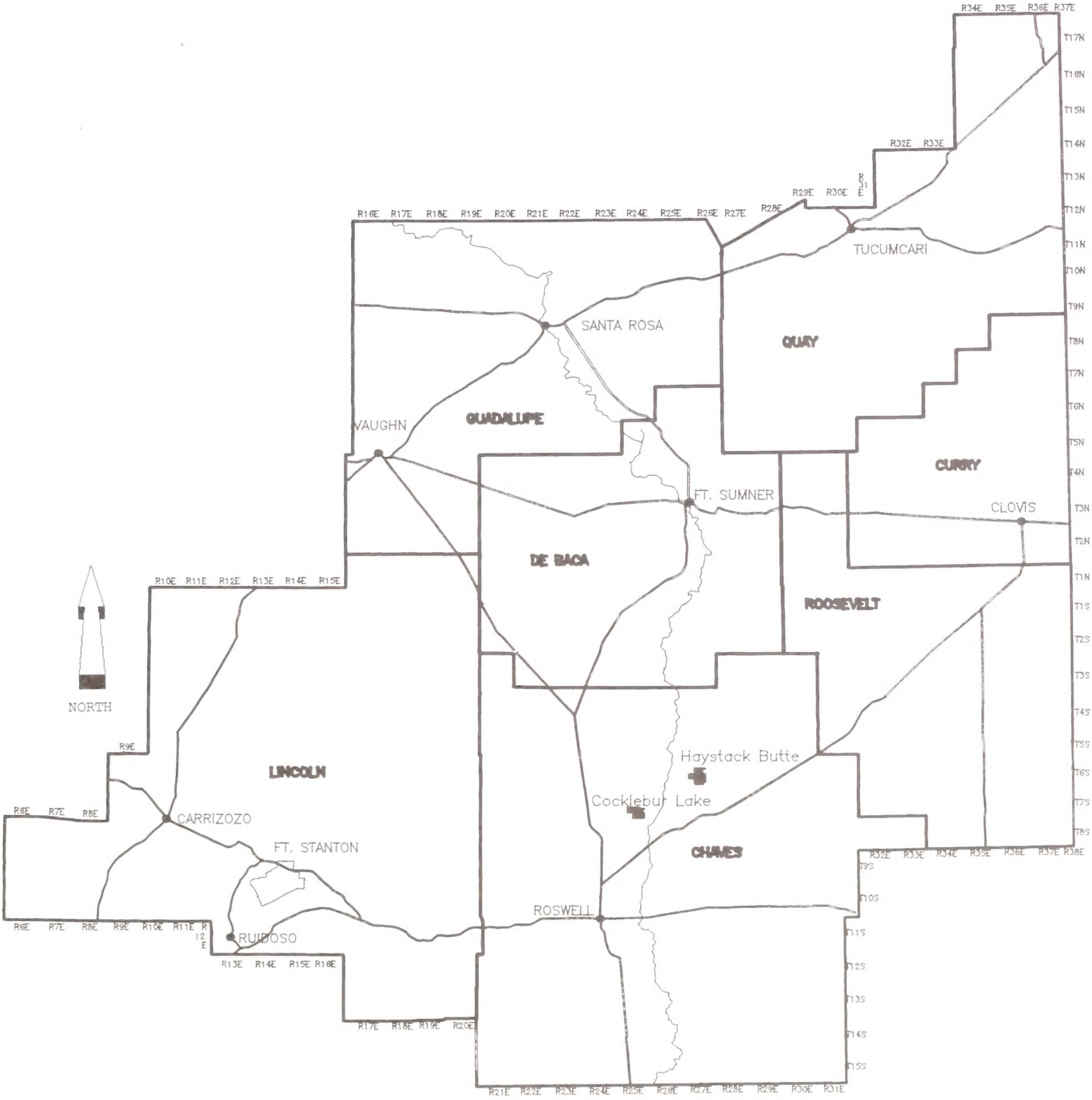
Approximately five percent of the recorded archeological sites in the resource area would be managed to emphasize public values and interpretation. The management objective for public values and interpretation would be to develop archeological properties for public use. This would be achieved by scientifically treating a site, such as by excavation and developing exhibits so that the cultural property is interpreted for public recreation and education. The Garnsey Bison Kill site near Bottomless Lakes and Lower Stanton Ruin-Feather Cave at Fort Stanton are two sites that would lend themselves to interpretation.

Approximately 75 percent of the recorded archeological sites would be managed for information use. Management would emphasize the use of cultural properties for the purpose of gaining knowledge. This would be achieved by scientifically studying the property in whatever ways are appropriate in order to extract as much information as possible. Two sites which are currently being studied are the Upper Bonito I and Lower Stanton Ruin.

An area of 3,400 acres at Haystack Butte would be nominated as a National Register Archeological District (see Map 22). Management of the District would emphasize protection of the very high density of well preserved sites. A secondary emphasis would be the study of selected sites to increase knowledge of the area. Both the outright acquisition of, or conservation easements on, about 640 acres of state land and 40 acres of private land would be considered if the opportunity arose, and added to the District, bringing the total acreage to 4,080 (see Table 33). Any acquired lands would be managed according to the management prescriptions for this alternative. In order to classify the cultural properties in an area, the sites would need to be studied. Once sites were selected for interpretation or for further study to increase knowledge, activity plans would be prepared and approved before implementation. The following management actions would be employed in management of the site: (See Tables 27, 28, 29, 30, 31, and 40)

- oil and gas: closed to leasing
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: exclusion area for major rights-of-way
- OHV designations: OHV use limited to designated roads and trails

Approximately 3,000 acres of BLM-administered land at Cocklebur Lakes would be nominated as a


NORTH
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DE BACA
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LINCOLN
CARRIZOZO
FT. STANTON
RUIDOSO
Haystack Butte
Cocklebur Lake
CHAVES
ROSWELL
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T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E R32E R33E
R10E R11E R12E R13E R14E R15E
R6E R7E R8E R9E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 22
PROPOSED ARCHAEOLOGICAL DISTRICTS
Roswell Resource Area

The Mescalero Sands is a popular off-highway vehicle use area.

OUTDOOR RECREATION MANAGEMENT

Recreation Management

Goal: Manage recreation resources to emphasize semi-primitive non-motorized recreation opportunities, while providing environmental protection of ecosystems.

The Mescalero Sands ACEC, Fort Stanton ACEC, Overflow Wetlands ACEC, Roswell Cave Complex ACEC, Mescalero Sands North Dunes OHV Area, Haystack Mountain OHV Area, Garnsey Bison Kill Site, Rio Bonito acquired lands, and Valley of Fires Recreation Area would be designated Special Recreation Management Areas (see Map 23). The public lands not designated Special Recreation Management Areas would be designated an Extensive Recreation Management Area (ERMA).

At the Valley of Fires Recreation Area, approximately four miles of additional hiking trails would be developed to provide access from the campground through the lava flow to the Cooper Cabin. Other recreation facilities, trails and roads at the Valley of Fires Recreation Area would be developed and maintained in accordance with the established plan for the area. About 493 acres of private land and 19 acres of state land on the east side of the presently developed area would be considered for acquisition, to provide space for future expansion of the developed area.

Lands acquired along the Rio Bonito near Lincoln (Tracts 1-4) would be managed for low intensity recreational use. Recreation activities that would be emphasized are fishing, nature viewing, and trail and non-trail hiking. The development at these sites could include dirt access roads and parking areas.

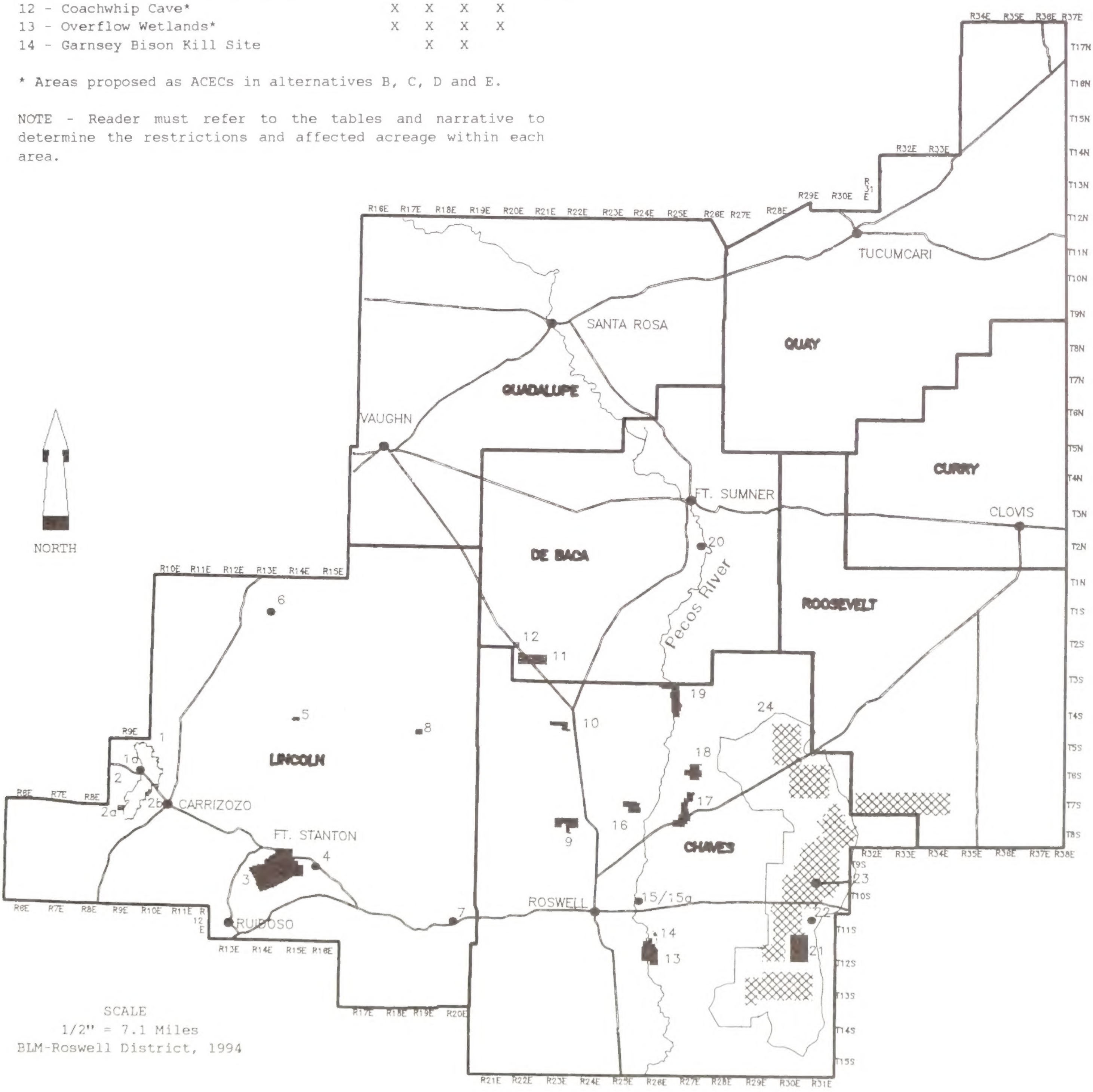
Special Recreation Management Areas (SRMAs), by Alternative

	A	B	C	D	E
1 - Little Black Peak WSA	Not Applicable				
1a - Millrace Cave*		X	X	X	X
2 - Carrizozo Lava Flow WSA	Not Applicable				
2a - Crockett Cave*		X	X	X	X
2b - Valley of Fires Recreation Area		X	X	X	X
3 - Fort Stanton*		X	X	X	X
4 - Rio Bonito Acquired Lands		X	X	X	X
5 - Zia Christine Cave*		X	X	X	X
6 - Alleged UFO Crash Sites	Not Applicable				
7 - Border Hill NNL	Not Applicable				
8 - Torgac Cave*		X	X	X	X
9 - Angora-Corn Cave*		X	X	X	X
10 - Martin-Antelope GYP Cave*		X	X	X	X
11 - Crystal Caverns-Devil's Well*		X	X	X	X
12 - Coachwhip Cave*		X	X	X	X
13 - Overflow Wetlands*		X	X	X	X
14 - Garnsey Bison Kill Site			X	X	

	A	B	C	D	E
15 - Bat Hole Cave*		X	X	X	X
15a- Comanche Hill	Not Applicable				
16 - Cocklebur Lakes Arch. District	Not Applicable				
17 - Haystack Mountain OHV Area		X	X	X	X
18 - Haystack Butte Arch. District	Not Applicable				
19 - North Pecos*	Not Applicable				
20 - Billy the Kid Recreation Area					X
21 - Mescalero Sands OHV Area		X	X	X	X
22 - Mescalero Sands*		X	X	X	X
23 - Mathers RNA	Not Applicable				
24 - Caprock WHA	Not Applicable				
▨ - Prairie Chicken Core Habitat	Not Applicable				

* Areas proposed as ACECs in alternatives B, C, D and E.

NOTE - Reader must refer to the tables and narrative to determine the restrictions and affected acreage within each area.



SCALE
1/2" = 7.1 Miles
BLM-Roswell District, 1994

MAP 23
SPECIAL RECREATION MANAGEMENT AREAS
Roswell Resource Area

If Tract 5 is acquired, it would be considered for development as a day-use area, which would include picnicking facilities and rest rooms. Livestock grazing would be excluded from the Tract 5 site.

The Garnsey Bison Kill Site would be managed as an outdoor archaeological and paleontological classroom with emphasis on cultural and natural resource protection. Limited development of the site would be considered and could include a self-guided interpretive trail with signs and markers, and off-site interpretation. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

The area listed below and in Table 27 would be closed to the leasing of oil and gas.

- Mathers Research Natural Area

The areas listed below and in Table 26 would be open to the leasing of oil and gas with "no surface occupancy."

- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV Area
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 28 would be proposed for withdrawal from entry or appropriation under the public land laws, including the general mining laws.

- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Haystack Mountain OHV Area (staging area)
- Valley of Fires Recreation Area

The areas listed below and in Table 29 would be closed to the leasing of solid minerals.

- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Valley of Fires Recreation Area
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV area

The areas listed below and in Table 30 would be closed to the disposal of mineral materials (salable minerals).

- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV area
- Mathers Research Natural Area
- Valley of Fires Recreation Area

The areas listed below and in Table 31 would be excluded from major rights-of-way.

- Rio Bonito acquired lands
- Mathers Research Natural Area
- Valley of Fires Recreation Area
- U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)
- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Haystack Mountain OHV Area (applies to overhead power and telephone lines)

The area listed below and in Table 32 would be avoided when locating major rights-of-way.

- Mescalero Sands North Dune OHV area (applies to overhead power and telephone lines)

Cave and Karst Resource Management

Goal: To protect cave values while allowing for limited recreational, commercial and educational use. Research and scientific use would have priority over other uses.

Visitor use limits, seasons of use, and a permit system would be established for all significant caves where the entrance is on public land.

No surface occupancy would be allowed within 400 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. No surface occupancy would be allowed within 200 meters of all other cave entrances, passages or aspects, or karst features. Refer to Appendix 3 for more information on this restriction.

Off-Highway Vehicle (OHV) Management

Goal: Manage OHV use to provide adequate access and reduce adverse impacts on sensitive resource values. Provide OHV users with acceptable public land areas in which to travel off highway.

Inventories, public review, and transportation planning would be conducted to support road-by-road designations for roads and trails suitable for off-highway vehicle use. Proposed designations are listed in Table 40 and shown on Map 14. All roads and trails not otherwise categorized would be designated limited to designated roads and trails for off-highway vehicle use. Pending completion of formal designations, all roads and trails would be managed as limited to existing roads and trails for off-highway vehicle use.

The Mathers RNA (242 acres) would be closed to off-highway vehicle use, except for two existing roads, which would be classified as limited to designated roads or trails.

Public lands within the present boundaries of the Carrizozo Lava Flow and Little Black Peak WSAs (25,321 acres) would be designated closed to off-highway vehicle use to protect outstanding primitive and semi-primitive values. Any state or private lands acquired within the present boundaries of the WSA's would be designated closed to OHV use. Public land and acquired state or private lands adjacent to the WSAs would be designated limited to designated roads and trails for OHV use to provide access and limit impacts to fragile soils and vegetation.

The 610-acre Mescalero Sands North Dune OHV Area would be designated open to OHVs and managed for intensive use, with emphasis on providing a quality play area for OHVs. Planned upgrades and development include interpretive/safety displays with emphasis on the National Tread Lightly Program, sun shelters, rest rooms and potable water. Livestock would be excluded from the entire OHV area by means of a perimeter fence.

Approximately 3,500 acres at the Haystack Mountain OHV Area would be managed as an OHV Intensive Use Area and designated limited to designated roads for all-terrain vehicles less than 50 inches in width. An easement about 50 feet by 100 yards in size would be acquired through two state sections to provide access to the northern portion of the OHV area. Non-motorized use of the Haystack Mountain OHV Area would be allowed. Facilities would be considered for development, such as rest rooms, sun shelters, trails, interpretive displays and picnic sites.

Approximately 400 acres in the Valley of Fires Recreation Area would be designated closed to OHV use to protect the viewshed from the existing campground and nature trail. The remainder of the area, 63 acres in the developed area, would be designated limited to designated roads and trails for off-highway vehicle use for maintenance needs and future campground development.

The Rio Bonito acquired lands (Tracts 1-5) would be designated limited to designated roads and trails for off-highway vehicle use to protect riparian values.

The 150-acre Border Hills Structural Zone National Natural Landmark would be designated closed to off-highway vehicle use to protect the integrity of the geologic structure.

Approximately 120 acres of the 360 federal acres at the Garnsey Bison Kill site (the core area) would be designated closed to off-highway vehicle use to protect the archaeological and paleontological sites. The remaining 240 federal acres and any acquired lands would be designated limited to designated roads and trails to protect the watershed above the bison kill site. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

Approximately 3,000 acres in the proposed Cocklebur Lakes National Register Archeological District and about 3,400 acres in the proposed Haystack Butte National Register Archeological District would be designated limited to designated roads and trails for off-highway vehicle use.

Following inventory, if it is deemed necessary to protect a significant cave from OHV impacts, a cave exclosure would be constructed and the area within the enclosure would be designated closed to off-highway vehicle use.

Approximately 19,200 acres of public land in floodplains, and riparian and wetland areas along both sides of the Pecos River would be designated closed to off-highway vehicle use to protect riparian and wetland values.

Approximately 17,200 acres encompassing 56 playas and alkali lakes, and the area within 400 meters of playas and alkali lakes would be designated closed to off-highway vehicle use to protect wetland habitat for waterfowl and shorebirds and to enhance the biodiversity of the grassland community type.

Approximately 3,320 acres encompassing the area within 400 meters of the source of about 20 springs or seeps, and within 200 meters on either side of downstream riparian areas created by flows from the source or resulting from riparian area management, would be designated closed to off-highway vehicle use to enhance riparian values.

The Comanche Hills "B" Area (approximately 883 acres) would be designated closed to OHV use to protect scenic views from U.S. Highway 380 and to reduce the disturbance of waterfowl at the Bitter Lake National Wildlife Refuge.

Wilderness Management

The Little Black Peak and Carrizozo Lava Flow WSAs (25,312 acres) would be managed for roadless recreational opportunities.

If Congress does not designate the WSAs as wilderness, a recommendation would be made to Congress that the Little Black Peak and the Carrizozo Lava Flow areas (not necessarily the WSAs) be designated a National Conservation Area.

Visual Resource Management

Painting would be required of all permanent surface facilities or equipment approved by the BLM. Paint colors would be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. Refer to Appendix 3 for more discussion of this topic.

WATERSHED MANAGEMENT

Soil Management

Goal: Provide benefits and prevent damage to other resources by managing soil resources.

Best Management Practices (BMPs) would be used to minimize sedimentation as a cause of nonpoint source pollution in surface waters. The BMPs, based on standard operating procedures, oil and gas lease stipulations or BLM policy, would be specified in activity plans for actions that make soils more susceptible to erosion, or which impair soil productivity. The primary emphasis would be placed on preserving environmental values. Activities requiring implementation of BMPs would include, but would not be limited to:

- soil disturbing activities that result in soil loss due to accelerated wind or water erosion;
- activities that reduce vegetative cover, thus exposing the soil to erosion processes, and reducing the amount of soil organic matter and soil productivity;
- activities that tend to concentrate surface runoff or steepen hydraulic gradients, thus increasing soil erosion by flowing water;
- activities that result in sediment loading directly to streams;
- activities that damage soil structure by compaction or other means; and
- activities that degrade the physical, chemical, or biological properties of the soil, such as high-intensity burns, contamination by toxic substances, or other means.

No occupancy or use would be allowed on slopes over 10 percent. Occupancy or use of fragile soils would be considered on a case-by-case basis. Refer to Appendix 3 for more discussion of this restriction.

Surface Water Management: Quantity

Goal: Increase water availability by enhancing annual water yields, instream flows, and discharge from springs, while also reducing resource damage by floods and accelerated erosion.

Strategic watershed management plans would be developed and implemented for watersheds that are susceptible to severe long-term soil losses or gully erosion, and which have a high potential to respond to treatment.

Plans would be developed for the following watersheds susceptible to severe long-term soil loss (i.e. mean annual soil loss over the delineated area is estimated to be 1.0 acre-feet/mi^2/yr or more), shown on Map 41, in Chapter 3:

- Rio Bonito including Salado Creek;

- Pecos River (from confluence of Yeso Creek to Bitter Lake National Wildlife Refuge); and

- the closed drainage area to Nakee Ishee Lakes.

Plans also would be developed for the following watersheds susceptible to severe gully erosion, shown on Map 41, in Chapter 3:

- Rio Bonito including Salado Creek;
- Arroyo del Macho;
- Gallo Arroyo;
- Felix River.

As part of the watershed management plans prepared for these six watersheds, site-specific prescriptions would be written which could include, but not be limited to, the following practices: (1) vegetation treatments by mechanical means or prescribed fire; (2) plantings of native riparian plant species and seeding of herbaceous ground cover; (3) livestock grazing management by controlling livestock numbers and season of use, and by providing alternative water and mineral sources; (4) construction of erosion, sediment and flood control structures; (5) use of other methods determined most suitable for site-specific conditions; (6) implementation of a monitoring program, including a feedback loop which would guide management based on monitoring information.

Springs and seeps, playas, and sinkhole lakes on public lands would be developed to improve wetland and riparian habitat, and to increase water availability. Water sources would be prioritized for development based on the following criteria:

- Presence of threatened or endangered species;

- Potential habitat for threatened or endangered species;

- Presence of perennial water or ephemeral water for extended periods;

- Presence of native riparian vegetation;

- Significant ground-water recharge areas;

- Limited alternative water sources in the area for wildlife and livestock;

- Federal ownership of both surface and subsurface estates.

Water source developments could include, but are not limited to:

- Protective exclosures;
- Native riparian plantings;
- Construction of supplemental water pipelines;
- Control of undesirable vegetation; and
- Off-site livestock waters.

Surface Water Management: Quality

Goal: Maintain or improve the quality of surface waters to support all designated uses listed by the New Mexico Water Quality Control Commission (WQCC 91-1, Amendment 1). Water quality would be based on the general and specific stream standards outlined by the WQCC.

Further degradation of water quality would be prevented whenever practicable to meet present or possible future demands, such as domestic or municipal water supplies, irrigation, livestock, wildlife, recreation, aquatic and riparian habitat, and other uses. Degradation of surface water quality would be prevented even when deemed "justifiable as a result of necessary economic and social development" under the WQCC Antidegradation Policy.

Best Management Practices would be specified in activity plans for actions that degrade surface water quality through nonpoint source pollution. The primary emphasis of BMPs would be on preserving environmental values. Surface water quality parameters that would be addressed in BMPs include, but are not limited to: water temperature, turbidity, sediment transport and yield, chemical loading, and nutrient loading.

Due to "checkerboard" ownership in watersheds, management on BLM-administered lands alone may not be adequate to support designated stream uses. Where appropriate, cooperative agreements, MOUs, or other interagency efforts would be made to manage entire watersheds to maintain or improve water quality.

Groundwater Management

Goal: Maintain or improve groundwater quality to meet applicable state and federal standards.

Further degradation of groundwater quality would be prevented whenever practicable, even when WQCC standards allow for further degradation. Exceptions would be considered for areas specifically exempted by state or federal authorities.

Best Management Practices would be specified on a case-by-case basis for actions that degrade groundwater quality through nonpoint source pollution, for groundwater with 10,000 mg/l total dissolved solids (TDS) or less. The primary emphasis of BMPs would be on preserving environmental values. Groundwater quality parameters that would be addressed in BMPs include, but are not limited to: TDS, pH, volatile organic compounds, and heavy metals.

For any site proposed for pesticide treatment, the potential for groundwater contamination would be evaluated with the EPA rating system, DRASTIC (Aller et al. 1985). If the site proposed for treatment has a DRASTIC index greater than 100, it has a moderate to high potential for groundwater contamination. The proposed treatment would be modified or cancelled to prevent groundwater contamination.

Water Rights Management

Goal: Protect existing public land water supplies through federal reserved water rights and State appropriative water rights. Also, acquire and/or perfect water rights necessary to carry out multiple-use management through State law, acquisition, and the adjudication process.

For any proposed action on BLM-administered lands that would require the use of water, or which could affect water supplies elsewhere, the New Mexico State Engineer's Office (SEO) would be contacted to ensure protection of BLM water rights, and to prevent impairment of other users' water rights.

The acquisition or protection of water rights would be prioritized according to the following list (in descending order of importance):

1. Streams or rivers with special designation by Congress.
2. Other streams or rivers.
3. Springs.
4. Wells.
5. Natural water holes, playas, and sinkholes.
6. Reservoirs greater than 10 acre-feet capacity.
7. Reservoirs less than 10 acre-feet capacity.

Water use proposals filed with the SEO by entities other than the BLM that could affect water rights and uses on public lands would be evaluated for their impact on BLM water resources. Actions that would impair the quality of public land resources would be protested through procedures specified by the SEO.

Water rights held by the BLM would be maintained primarily through:

- Beneficial use, and maintenance of manmade diversions, where appropriate. The SEO would be notified of all water uses and relevant public land authorities. Proposals that require the use of BLM-held water would include specific provisions for meeting these requirements, prior to approval by the BLM Authorized Officer.

- Other opportunities, such as MOUs, water marketing, or other coordinated efforts, according to existing law.

WILDLIFE HABITAT MANAGEMENT

Special Status Species

Goal: Provide maximum protection for all Special Status Species, which are federal and state listed species, and federal candidate species, and their habitats on public lands. Conserve occupied and potential habitat for these species on public land to maintain or enhance populations at levels to avoid listing by either state or federal governments.

U.S. Fish and Wildlife Service Recovery Plans would be implemented, including the reintroduction of native special status species in suitable areas on public land in coordination and cooperation with local governments. Current plans cover the American peregrine falcon, bald eagle, Pecos gambusia, Kuenzler hedgehog cactus, Pecos bluntnose shiner and black-footed ferret.

Big Game/Upland Game Habitat Management

Goal: Maintain or improve habitat utilized by big game or upland game to provide sufficient quantity and quality of habitat (food, water, cover, space) necessary for population maintenance and expansion on public land.

Prescribed burns would be conducted in selected pinon-juniper community types at Fort Stanton and the Cedar Hills area west of Roswell. For each prescribed burn the acreage to be burned and the objective of the fire would be tied to wildlife habitat management and desired plant community management objectives described in activity plans. No surface occupancy would be allowed within up to 400 meters of existing or planned wildlife habitat improvement projects. Refer to Appendix 3 for more discussion of this restriction.

Big game and upland game transplants or reintroductions on public lands would be conducted when cooperatively prescribed by the BLM and the New Mexico Department of Game and Fish (NMDGF). Projected transplants or reintroductions include, but are not limited to:

- Pronghorn antelope in pastures that meet the suitability criteria (Appendix 12);
- Mule deer in areas of low population density or in areas to enhance deer herd gene pools;
- Wild turkey at Fort Stanton and on the Rio Bonito acquired lands;
- Other big game or upland game species recommended by the NMDGF.

If opportunities arise, acquisitions of non-federal lands would be considered in the following instances, to improve management of big game. Acquisitions in the Mescalero Sands deer management area would benefit special status species and raptor habitat management goals, as well.

- Mescalero Sands deer management area: 18,969 acres of state land; 8,840 acres of private land
- Cedar Hills and Pecos River deer management areas: 3,521 acres of state land
- Rio Bonito area: 279 acres of state land

Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in lesser prairie chicken habitat during the period of March 1 through June 30, each year. Additionally, no new drilling would be allowed within 200 meters of leks known at the time of permitting. Refer to Appendix 3 for more discussion of these restrictions.

Major rights-of-way would be excluded from core lesser prairie chicken habitat areas. Refer to Table 31 and Appendix 18.

Major rights-of-way would be avoided in the Caprock WHA outside of core prairie chicken habitat (see Table 32).

Waterfowl Habitat Management

Goal: Perpetuate a diversity and abundance of waterfowl populations in the Central Flyway by protecting and enhancing wetlands, including playa lakes, alkali lakes, sinkhole lakes and earthen tanks.

Develop as many as 400 acres of wetland habitat in suitable areas within the floodplain of the Pecos River. Suitability criteria include but are not limited to:

- Areas with seasonal surface waters indicative of a high water table and subsurface clay layer;

- Areas with the potential of supporting cottonwood trees;

- Areas that have or would receive vegetation manipulation projects (salt cedar control, prescribed fire, riparian pasture development).

No surface occupancy would be allowed within up to 400 meters of active heronries. Refer to Appendix 3 for more discussion on this restriction.

Agricultural practices and moist soil management techniques would be used to enhance yearlong food supplies for wildlife on the lands acquired along the Rio Bonito. These practices may include but are not limited to:

- Share cropping of valuable foods (alfalfa, winter wheat, barley, pasture grasses) with a portion left as a standing crop for wildlife;

- Seasonal flood irrigation;

- Construction of irrigation ponds and wells;

- Construction of boundary and pasture fences.

Raptor Habitat Management

Goal: Provide suitable raptor habitat conditions on public lands through the conservation and management of essential habitat components, including habitat for prey species.

Nesting, migration, and wintering areas for raptors would be protected or enhanced on about 926,000 acres of public lands in the Macho, Caprock, Fort Stanton and Overflow Wetland wildlife habitat areas, and along the Pecos River.

Management emphasis for protection and enhancement of habitat would be focused on known key raptor areas and those identified in the future. Management practices could include developing protective exclosures around tree groves and sinkholes, and constructing raptor nesting platforms.

No surface occupancy would be allowed within 400 meters of active raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments. Refer to Appendix 3 for more discussion of this topic.

Fisheries and Aquatic Habitat Management

Goal: Protect and enhance aquatic habitat and associated natural diversity and distribution patterns of native nongame and sport fish, invertebrates, and aquatic mammals that occur, or have the potential to occur, in waters located on public land.

Construction of streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection would be allowed for the Rio Bonito, Salado Creek and the Pecos River. Criteria for consideration include, but are not limited to, areas that:

- Exhibit streambank sloughing;
- Lack riparian vegetation or regeneration;
- Exhibit invasion of exotic or undesirable plant species;
- Exhibit erosion of side drainages;
- Lack riparian pastures to control livestock use.

Monitor lotic and lentic systems for:

- Compliance with established water quality standards;

- Fish and macroinvertebrate productivity and composition;

- Stream channel substrate condition as it relates to watershed condition;

- Use of water rights, where established.

Native fish and sport fish introductions or transplants would be undertaken in suitable waters located on public land, in coordination with the New Mexico Department of Game and Fish. Proposed introductions include but would not be limited to:

- Rainbow, cutthroat, brown, and brook trout in the Rio Bonito;

- Bass and bluegill in irrigation ponds.

Criteria for suitable waters include, but are not limited to:

- Availability, regime, and security of perennial water;

- No or low populations in stream segments with suitable habitat conditions (e.g., water flow, temperature, stream shading, pools & riffles, stable streambanks, water quality, substrate condition, invertebrates);

- Channel dimension and capacity.

Riparian/Wetland and Playa Lake Management

Goal: Restore and maintain riparian/wetland areas to achieve proper functioning condition. Provide the widest variety of native vegetation and habitat diversity for wildlife, fish, and watershed protection. Achieve an advanced ecological status, except where resource management objectives would require an earlier successional stage.

Lands within 400 meters of the source of springs and seeps, and within 200 meters on either side of downstream riparian areas created by flows from the source, or through riparian area management, would be considered for withdrawal from all forms of entry under the public land laws, including the general mining laws. Areas to be withdrawn would be prioritized according to the following criteria:

- Presence of threatened or endangered species;
- Potential habitat for threatened or endangered species;
- Limited alternative water sources in the area for wildlife and livestock;
- Federal ownership of both surface and subsurface estates;
- Presence of native riparian vegetation.

No surface occupancy would be allowed within up to 400 meters of playas and alkali lakes, perennial streams, rivers and floodplains and springs and seeps. Refer to the Surface Use and Occupancy Requirements in Appendix 3 for more discussion on these restrictions.

Springs and seeps, reservoirs, earthen tanks and playa lakes would be enhanced by constructing protective exclosures, planting native vegetation, establishing vegetation for wildlife cover, controlling undesirable vegetation, constructing supplemental water pipelines to specific sites, and providing off-site livestock water.

An estimated 3,000 acres of federal minerals in the floodplain, or within 400 meters of the floodplain, of the Pecos River in Chaves County, would be closed to the leasing of solid minerals.

If opportunities arise, acquisition would be considered for 590 acres of state land and 1,051 acres of private land within or adjacent to playa lakes, and for 1,440 acres of state land and 2,955 acres of private land along the Pecos River. Any acquisitions in these areas would benefit riparian, wetland and playa lake management efforts.

FIRE MANAGEMENT

Goal: Limit damage caused by wildfire to natural resources and to life and property. Wherever possible, restore fire to its natural role in the ecosystem through the use of prescribed fire. Use prescribed fire as a tool for land treatment to replace or augment the use of vegetation treatments.

Prescribed fire

Prescribed fires ignited by the BLM, including the re-treatment of acreage previously burned, would be conducted. For each prescribed burn the acreage to be burned and the objective of the fire would accomplish specific land management objectives identified in activity plans by specialists in one or more of the Resource Area's management programs. Prescribed fires generally are tied to vegetation management objectives based on vegetation types, which are: salt cedar; upland grasslands; pinon/juniper invasion areas; and areas of sacaton. Prescribed fire would be used, when possible, to treat vegetation as part of the process of attaining the identified desired plant community for a given area.

Prescribed natural fire would be employed to accomplish land management objectives when the following criteria are met:

- fire planning for the use of prescribed fire has been completed, including establishing burning prescriptions and boundaries of areas to be burned

- ignitions occur in the period February through May

- funding already has been programmed for planned prescribed fires and adequate personnel and equipment are available to achieve defined objectives

- ignitions occur in salt cedar along the Pecos River or other drainages; in juniper at Fort Stanton east of State Highway 214; in areas of sacaton; and in upland grassland communities.

Protection from wildfire

Resource advisors would be on hand to provide advice on tactics employed during suppression under either the conditional or full fire suppression response levels.

Archeological site data on base maps and in site records would be reviewed to determine the location and significance of cultural resources before using heavy equipment to construct fire line, except where personal safety or property are threatened, or when resource values outweigh cultural values. Wherever possible, an archeologist would monitor the use of heavy equipment to ensure that cultural resources would be avoided.

Protection of wetlands and surrounding habitat for waterfowl and T&E fish in the Overflow Wetlands would be accomplished without the use of bulldozers and other heavy equipment, or chemical fire retardant.

The conditional fire suppression response level would be applied resource area-wide, with the following exceptions, where full suppression would be used.

- Protection of life or property, in any situation.

- Pecos River: Protect important vegetation, such as cottonwoods and willows, in riparian/wetland habitat within the 100-year floodplain. Limited use of machines, such as bulldozers, may be required, based on the advice of a resource advisor. For fires in salt cedar, resources such as heavy equipment or chemical fire retardant could be employed to limit the spread of fire to the smallest possible area.

- Caprock WHA: For wildfires occurring in treated pastures in the months of April through January, full suppression would be employed to protect wildlife habitat. In February and March, and depending on the location of the fire relative to previous vegetation treatments, suppression activities may occur at the conditional level and may be limited to monitoring the wildfire.

- Fort Stanton: Protection of the Kuenzler hedgehog cactus, the entrance of Fort Stanton Cave, the Rio Bonito Campground, and screening trees around the campground would be accomplished with full suppression, except that heavy equipment would not be used to construct fire line.

- Playas larger than 20 acres, springs and seeps, other riparian areas: Fire suppression would include protection of these areas from surface disturbance and the effects of chemical fire retardant, by prohibiting the use of engines, heavy equipment and retardant drops in riparian areas.

- Caves and karst areas: Fire suppression in cave and karst areas would include protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of heavy equipment to construct fire line within 400 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Heavy equipment would not be used within 200 meters of all other caves, entrances, passages or aspects, or karst features.

- Valley of Fires Recreation Area: Protection of the recreation area would be accomplished without the use of heavy equipment to construct fire line.

- Border Hills National Natural Landmark: The use of heavy equipment to construct fire line within this area would be prohibited.

- Steep slopes: Fire line would not be constructed with heavy equipment on slopes greater than 10 percent, except to protect life or property.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The boundaries of the ACECs described below have been established based on the presence of resources and opportunities for efficient management, irrespective of land ownership. The inclusion of other ownerships in ACECs is for purposes of disclosure and does not mean those lands would be designated as part of an ACEC, or that the management proposed in this alternative would be applied to those lands. The acquisition of non-federal lands within ACECs is included in the management proposed in this alternative. If non-federal lands are acquired, those lands could then become part of a designated ACEC and be managed according to the management proposed in this alternative, without additional land use planning.

Refer to Map 15 for locations of these areas. Refer to Appendix 13 for discussions of relevance and importance criteria for Areas of Environmental Concern. Refer to Appendix 14 for maps that display the differences among the alternatives.

Overflow Wetlands ACEC

The Overflow Wetlands ACEC comprises 6,814 surface acres and 3,000 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 2,987 acres
State land, 1,720 acres
Private land, 2,107 acres

Management Goals:

Protect the biological and scenic values of the Overflow Wetlands WHA, which provides critical habitat for T/E fish species and supports a significant riparian/wetland plant community.

Management Prescriptions:

About 700 acres (the wetlands proper) would be closed to future leasing of oil and gas. About 2,300 acres would be open to future leasing with "no surface occupancy."

About 3,000 acres would be closed to the disposal of salable minerals and to the leasing of solid minerals, and would be withdrawn from entry under the land laws (including the 1872 Mining Law). These actions would reduce disturbance of the wetlands and surrounding habitat for wildlife species dependent on the area either seasonally (wintering waterfowl) or yearlong (T/E fish).

Major rights-of-way would be excluded on about 3,000 acres of public land in the Overflow Wetlands WHA to benefit wildlife species dependent on the area either seasonally (wintering waterfowl) or yearlong (T/E fish).

About 1,700 acres of state land and 2,100 acres of private land with riparian/wetland values would be acquired as opportunities arise. Any lands acquired would be managed according to the prescriptions of this alternative.

Legal access (easements) to the Overflow Wetlands would be acquired to resolve conflicts and enhance management in situations where existing roads that originate from county or state roads are interrupted by private or state land inholdings.

Public grazing leases or permits affecting about 3,000 acres of public land currently in Allotments 65060, 65062, and 65069 would be adjusted to improve habitat for wintering waterfowl habitat. Adjustments may include changes in stocking rate and seasons of use, such as reducing year-long grazing to grazing between March 1 and June 30. The grazing lease on Allotment 65041 would be cancelled.

Salt cedar treatments would be conducted on public land in selected riparian-wetland areas using prescribed fire or mechanical control.

About 700 acres would be designated closed to OHV use. The use of OHVs on about 2,300 acres would be limited to designated roads and trails.

The Overflow Wetlands ACEC would be developed to showcase one of New Mexico's prime wetland areas. Developments may include nature trails with wooden walkways and observation overlooks, restroom facilities, picnic tables, trash containers, parking areas, bulletin boards, and upgrading existing access roads.

The BLM would recommend to the New Mexico Department of Game and Fish that the wetlands be designated as a "No Minnow Seining Area" to prevent the taking of the Pecos pupfish.

Public fishing opportunities would be considered for development along the Pecos River on public lands in the areas listed below.
Development may include physical access to fishing sites, parking areas, and fence crossings.

T. 12 S., R. 26 E.,
Section 5: W1/2W1/2
Section 17: W1/2NE1/4,SE1/4
Section 20: NE1/4NE1/4NE1/4

Riparian and aquatic habitats would be protected by acquiring water rights, entering into cooperative agreements for management of those habitats, or other methods.

As many as 300 acres of additional riparian/wetland habitat would be developed. Development may include constructing low berms and dikes, seeding or planting native riparian vegetation, and modifying existing channels. Suitability criteria for development include, but are not limited to:

- Areas with seasonal surface waters indicative of a high water table or subsurface clay layer
- Areas with the potential of supporting cottonwood tree groves
- Areas that have been or would be subject to vegetation manipulation (salt cedar control, prescribed fire, riparian pasture development)

Chemical fire retardant and heavy equipment such as bulldozers and road graders would not be used for wildfire suppression.

North Pecos River ACEC

The North Pecos River ACEC comprises 6,400 surface acres and 4,200 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 3,360 acres
State land, 1,160 acres
Private land, 1,880 acres

Management Goals:

Protect the biological and scenic qualities of the North Pecos River ACEC, which provides critical habitat for T/E fish species and supports a significant riparian plant community.

Management Prescriptions:

About 2,080 acres of federal minerals would be closed to future oil and gas leasing. About 2,120 acres of federal minerals would be open to future leasing with No Surface Occupancy.

About 4,200 acres of federal minerals would be closed to the disposal of salable minerals and the leasing of solid minerals, and be withdrawn from entry under the land laws (including the 1872 Mining Law), to eliminate surface disturbance along the Pecos River and in surrounding wildlife habitat.

Public lands in the ACEC and lands acquired by the BLM for special status species and riparian/wetland habitat management would be designated right-of-way exclusion areas for major rights-of-way.

Legal access (easements) to the North Pecos River ACEC would be acquired to resolve conflicts and enhance management in situations where existing roads that originate from county or state roads are interrupted by private or state land inholdings. The need for acquiring easements would be evaluated on a case-by-case basis as land acquisitions may eliminate the need for some easements.

About 1,160 acres of state land and 1,880 acres of private land with riparian/wetland values would be acquired as opportunities arise. Acquisition of riparian/wetland habitat would be based on the consideration of the criteria in Appendix 8.

Salt cedar control would be conducted on public land in selected riparian-wetland areas, using prescribed fire or mechanical control.

Public grazing leases or permits affecting about 3,360 acres of public land would be adjusted to improve riparian habitat. Adjustments may include changes in seasons of use and stocking rates. Grazing practices would be modified on lands within the ACEC that are currently in Allotments 64038, 64039, 64538, and 65001.

About 3,360 acres of public land would be designated closed to use by OHVs.

The BLM would recommend to the New Mexico Department of Game and Fish the designation of the wetlands in the ACEC as a "No Minnow Seining Area," to prevent the taking of the Pecos bluntnose shiner.

Mescalero Sands ACEC

The Mescalero Sands ACEC comprises 10,007 surface acres and 7,931 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 7,888 acres
State land, 1,800 acres
Private land, 320 acres

Management Goal:

Protect the biological, archaeological and scenic qualities of the Mescalero Sands ACEC, with emphasis on the preservation of a portion of the shinnery oak-dune community to enhance the biodiversity of the ecosystem.

Management Prescriptions:

The entire federal mineral estate in the ACEC would be closed to future oil and gas leasing.

The entire federal mineral estate in the ACEC would be proposed for withdrawal from entry under the public land laws, including the 1872 Mining Law. The ACEC would also be closed to solid mineral leasing and the disposal of salable minerals.

Major rights-of-way would be excluded from the ACEC to protect active dunes and surrounding habitat.

Legal access to the ACEC, especially from the east and across state lands would be acquired, as needed, to resolve conflicts and enhance management. Easement acquisitions would be evaluated on a case-by-case basis since the potential acquisition of land may eliminate the need for easements.

As many as 1,800 acres of state and 320 acres of private lands in the ACEC would be considered for acquisition if opportunities arise. Any land acquired would be managed according to the management prescriptions in this alternative.

The entire ACEC would be closed to livestock grazing to protect and maintain the shinnery oak/tall grass community and cottonwood groves in the ONA. The closure would affect parts of four allotments. To facilitate administration and management of the area, boundary fences would be constructed to separate the ACEC from other public lands. Projects designed for resource enhancement or protection would be considered.

The existing National Natural Landmark designation on 3,208 acres of federal, state and private land and the existing Outstanding Natural Area designation on 6,173 acres of federal land would be retained. Each of these areas is totally encompassed by the ACEC.

All public lands in the ACEC would be designated closed to OHV use.

Fort Stanton ACEC

The Fort Stanton ACEC comprises 24,630 surface acres and 27,622 acres of federal mineral estate. The state-owned hospital and prison and the Sierra Blanca Airport within the boundary of the ACEC are not included in the acreage of the ACEC.

Management Goal:

Protect the biological, archaeological and scenic qualities of Fort Stanton, while providing for quality recreation opportunity.

Management Prescriptions:

All lands in Fort Stanton would remain withdrawn from the general mining laws, closed to saleable and leasable mineral disposal, and closed to the leasing of oil and gas, with the exceptions of a 5-acre tract located in the NE1/4SE1/4, Sec. 9, T. 10 S., R. 14 E. and the 1,666-acre Sierra Blanca Regional Airport. Both of these areas would be open to the disposal of saleable minerals only.

Major rights-of-way would be excluded on 24,630 acres of public land to protect important plant and animal habitat, significant riparian, wetland and aquatic habitats, and visual quality.

As many as 1,480 acres of private and state lands adjacent to Fort Stanton would be acquired if opportunities arise. Any acquired lands would be managed according to the prescriptions of this alternative.

A BLM administrative site would be developed at Fort Stanton to provide onsite management of the ACEC if the BLM is unable to acquire existing facilities previously used by New Mexico State University. The site may consist of an office building, parking lot, corrals, and storage building.

Livestock grazing on Fort Stanton would be excluded to benefit the management of wildlife, recreation, watershed and other resources. Existing water developments would be converted to best fit the needs of wildlife. Other range improvements would be considered for total removal.

Prescribed burns would be conducted in selected pinon-juniper, riparian and grassland community types at Fort Stanton to improve wildlife habitat and reduce fuels. Fuelwood sales would be permitted in selected areas.

Salt cedar treatments would be conducted on as many as 300 acres of selected riparian/wetland habitat along the Rio Bonito and Salado Creek using prescribed fire or mechanical control (chain saws).

Approximately 330 acres around the Lower Stanton Ruin and Feather Cave would be managed to preserve, protect and interpret unique archeological values, artifacts and architectural features. The area would be called the Feather Cave Archeological Complex. In addition to the management prescribed for the Fort Stanton ACEC that would also apply to the Archeological Complex, the following specific management actions would be applied, as well:

- the Complex would be closed to livestock grazing;
- recreation development would be considered, such as a trail, signs and a parking area;
- off-site and limited on-site interpretation would be considered, including site stabilization for interpretive enhancement, exhibits, and signing and brochures.

Fort Stanton would be designated a Special Recreation Management Area with emphasis on providing quality recreational opportunities subordinate to the management of riparian and wildlife resources.

Recreation facilities such as toilets, tables, and fire rings at the Rio Bonito and Fort Stanton Cave campgrounds would continue to be maintained and upgraded.

In addition to the 40 miles of multi-use trails already in use, as many as 30 miles of existing roads and trails and 10 miles of new trails would be developed and maintained as multi-use trails for hiking, mountain bike riding, and horseback riding.

Camping at Fort Stanton would be managed by:

- Limiting vehicle camping (driving motorized vehicles to a campsite) to the Rio Bonito and Fort Stanton Cave campgrounds and any other designated campsites. But, in no case would camping be allowed within 100 feet of the Rio Bonito and Salado Creek.
- Permitting back country camping throughout Fort Stanton, except within 100 feet of the Rio Bonito and Salado Creek and no closer than 300 feet from wildlife waters, seeps or springs.
- Limiting all camping to no closer than one-quarter mile from waysides, overlooks, interpretive trails or state highways, except at developed campgrounds and designated campsites.

Fort Stanton Cave from the entrance to the Lake Room and from the entrance to Hell Hole and to Key Hole would be proposed for designation as a National Scenic Trail.

The use of OHVs would be limited to designated roads and trails, with the following exceptions:

- A 100-foot wide corridor measured from the edge of the creek along each side of the Rio Bonito and Salado Creek would be closed to OHV use to protect sensitive riparian resources, except for the use of designated roads within the corridor.

- All multi-use trails (horse, hiking and mountain biking) would be closed to OHV use. Mountain bike trails that are located on existing roads would be open for OHV use.

- The Feather Cave Archeological Complex would be closed to OHV use, except for U.S. Highway 380 and the Fort Stanton Cave Road.

Streambank stabilization structures, native riparian plantings, salt cedar control, and spring and drainage protection measures could be implemented on the Rio Bonito and Salado Creek. These practices would be used in situations including, but not limited to, areas that:

- Exhibit streambank sloughing;
- Lack riparian vegetation or regeneration;
- Exhibit invasion of exotics or undesirable plant species;
- Exhibit erosion of side drainages;
- Lack riparian pastures to control livestock use.

Riparian and aquatic habitat would be protected by maintaining minimum acceptable instream flow for Rio Bonito Creek at Fort Stanton by acquiring water rights, entering into cooperative management agreements, or other methods.

Big game or upland game transplants and reintroductions would be conducted on public lands when cooperatively prescribed by the BLM and the NMDGF. Transplants and reintroductions include, but are not limited to:

- Pronghorn antelope in pastures that meet the suitability criteria (see Appendix 12);

- Mule deer in areas of low population density or areas to enhance gene pools;

- Wild turkey;

- Other big game or upland game species recommended by the New Mexico Department of Game and Fish.

Native fish and sport fish introductions or transplants would be conducted in suitable waters on public land in coordination with the New Mexico Department of Game and Fish. Proposed introductions could include rainbow, cutthroat, brown, and brook trout in Rio Bonito Creek. Criteria for introductions or transplants include, but are not limited to:

- Perennial water availability;

- Existing populations indicate suitable habitat conditions but may need supplementing due to fishing pressure;

- No or low populations in stream segments with suitable habitat conditions such as water flow, temperature, stream shading, pools & riffles, and stable streambanks.

The full wildfire suppression response level would be applied at Fort Stanton to protect Kuenzler cactus habitat, the entrance to Fort Stanton Cave, the Rio Bonito Campground and screening trees around the campground, and the Feather Cave Archeological Complex. Heavy equipment would not be used to construct fire line.

Roswell Cave Complex ACEC

The Roswell Cave Complex ACEC consists of nine cave systems. The nine cave systems comprising the Roswell Cave Complex are: Angora-Corn Cave; Bat Hole Cave; Coachwhip Cave; Crockett Cave; Crystal Caverns-Devils Well Caves; Martin-Antelope Gyp Cave; Millrace Cave; Torgac Cave; and Zia Christine Cave. The ACEC comprises 16,818 surface acres. There are 14,894 acres of federal mineral estate in the ACEC, including 3,000 acres under private surface. The surface acreage consists of the following categories and acreages:

Public land, 11,894 acres
Private land, 4,920 acres

Refer to Table 41 for the categories and acreages of lands comprising the ACEC, listed by cave system.

Management Goal:

Protect the natural and scenic values of caves, while allowing for limited recreational, commercial, scientific and educational use.

Management Prescriptions:

The federal mineral estate in the ACEC, nearly 15,000 acres in size, would be closed to future leasing of oil and gas, the disposal of saleable minerals, and the leasing of solid minerals. The federal mineral estate would also be proposed for withdrawal from entry under the general land laws, including the 1872 Mining Law.

All lands in the ACEC would be designated exclusion areas for major rights-of-way.

The BLM would acquire access easements to caves for which legal access does not exist. The need for acquiring easements would be evaluated on a case-by-case basis as land acquisitions may eliminate the need for some easements. The cave systems to which access would be acquired are:

- Crockett Cave, 1.25 miles
- Crystal Caverns-Devils Well caves, 2.2 miles
- Millrace Cave, .33 mile

All public land in the ACEC would be retained. About 4,920 acres of private land would be acquired to protect the caves and their hydrologic processes, if acquisition opportunities arise (see Table 41). Any lands acquired would be managed according to the prescriptions in this alternative.

Fenced exclosures would be constructed around cave entrances when necessary to control access or reduce impacts to cave resources.

No livestock would be allowed within any cave exclosure. Grazing would be excluded on as many as 1,000 surface acres in the ACEC following the construction of exclosures.

The ACEC would be managed to maintain the cave systems in their natural condition. Management would include such things as graffiti and trash removal, protection against vandalism, and limiting the extent and location of trails.

Research and scientific use would have priority over other uses. These uses would be curtailed if there is a conflict with the protection of unique cave values.

Bat Hole Cave would be closed to all visitor use, except for administrative or research purposes, to protect the significant bat hibernacula and to protect visitors from extreme safety hazards associated with breakdown and vertical entrances. Coachwhip Cave, a typical gypsum cave, would be closed to all visitor use and managed as a control cave for future research and management programs.

Commercial cave guiding would not be allowed in caves of the ACEC until a comprehensive inventory of the biota and natural resources is accomplished. If surveys determine that these resources would not be affected by limited commercial use, then commercial use would be considered and use limits established consistent with management of the caves.

Visitation limits (human carrying capacity) and special stipulations would be prescribed in cave management plans. Caves in the ACEC with unique or outstanding values, or threatened or endangered species, could warrant development and implementation of additional, controls or gating. Documentation of use in all caves in the ACEC would be accomplished by permitting or the installation of cave registers.

About 500 acres of public lands in the ACEC would be designated closed to OHV use, not including lands already closed because they are within a wilderness study area. On the remainder of the public lands, OHV use would be limited to designated roads and trails. The OHV restrictions are displayed by cave, in Table 42.

With the exception of carbide in carbide lamps (miners' lamps), battery acid in flashlights and head lamps, and the temporary use of cave gate construction materials, no solid, liquid, or gaseous substances hazardous to human and animal life would be allowed within any cave or cave exclosure.

Wildfire suppression in the ACEC would include the protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of heavy equipment to construct fire line within 400 meters of known cave entrances, passages or aspects of caves, or significant karst features, or within the exclosures around caves.

TABLE 41
ROSWELL CAVE COMPLEX ACEC
SUMMARY OF ACREAGES (INCLUDING LANDS PROPOSED FOR CONSIDERATION FOR ACQUISITION[1])
ALTERNATIVES B, C, D, AND E

Cave System	BLM Surface and Mineral Estate Acres	Split Estate Acres	Private Acres for Acquisition	Total Acres
Angora-Corn	4,800			4,800
Bat Hole	40			40
Coachwhip	614			614
Crockett	640			640
Crystal Caverns-Devil's Well	2,280	2,840	4,120	6,400
Martin-Antelope Gyp	2,080		320	2,400
Millrace	480		160	640
Torgac	480		160	640
Zia Christine	480	160	160	640
Totals	11,894	3,000	4,920	16,814

[1] There are no State lands proposed for acquisition.

Source: BLM files, 1994.

TABLE 42
ROSWELL CAVE COMPLEX ACEC OFF-HIGHWAY VEHICLE DESIGNATIONS[1]
ALTERNATIVES B, C, D,AND E

Cave System	Acres Closed	Acres Limited	Total Acres
Angora-Corn	150	4,650	4,800
Bat Hole	40		40
Coachwhip	40	574	614
Crockett	20	620	640
Crystal Caverns-Devil's Gyp	50	6,350	6,400
Martin	50	2,350	2,400
Millrace	480[2]	160	640
Torgac	40	600	640
Zia Christine	20	620	640
Totals	890	15,924	16,814

[1] There are no public lands in the ACEC designated as open to OHV use.

[2] Approximately 480 acres of the Millrace Cave System is within the Little Black Peak WSA, which is closed to OHVs.

Source: BLM files, 1994.

ALTERNATIVE C

Alternative C emphasizes making the resources and values of the public lands available for production and development. While the emphasis is on production, it still provides for environmental protection.

In this alternative, management proposed for the Carlsbad Resource Area is found only in the Fluid Minerals section under the Minerals Management heading and in appendixes referenced in that section. All other proposed management in this alternative is for the Roswell Resource Area. The term "resource area" applies to the Roswell Resource Area.

The Surface Use and Occupancy Requirements (Appendix 3) would be applied, when applicable, to all actions described in this alternative.

MINERALS MANAGEMENT

Fluid Minerals

Goal: Enhance, encourage and improve the management of oil and gas resources. Some existing stipulations may be rescinded, and would be replaced by standard terms and conditions or less restrictive stipulations.

ROSWELL DISTRICT

The BLM administers approximately 13,835,000 acres of federal oil and gas mineral estate in the Roswell District. Under this alternative:

Approximately 13,258,994 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development under the BLM's standard terms and conditions, the Surface Use and Occupancy Requirements for this alternative (Appendix 3), the Roswell District Conditions of Approval (Appendix 4), and the Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas for this alternative (Appendix 5). The discrete components of these requirements would be applied on a case-by-case basis when needed to mitigate impacts or guide use. The Surface Use and Occupancy Requirements would be applied to new leases or as conditions of approval for proposed activities on existing leases, following NEPA analysis. The Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas would be applied as conditions of approval.

As a result of these requirements, some existing leasing stipulations would be rescinded or would be replaced by revised stipulations, in both the Carlsbad and Roswell resource areas. The proposed changes are summarized in Table 21.

Approximately 121,910 acres (1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued.

Approximately 454,096 acres (3 percent) would be closed to leasing. In these areas, existing leases would continue to be developed on a case-by-case basis. However, once leases terminate, they would not be re-offered for leasing.

Produced water disposal pits on public land in the Carlsbad Resource Area would not be allowed west of the Pecos River within the Capitan Reef and Back-Reef areas, and within 100-year floodplains, or near drainages, playas, water wells, or springs throughout the district. In all other areas in the Roswell District, disposal of produced water in lined pits would be permitted on public lands.

Reclamation of surface disturbance would be conducted according to standard operating procedures (conditions of approval). Reclamation usually consists of recontouring disturbed areas and reseeding.

CARLSBAD RESOURCE AREA

The BLM administers approximately 4,095,000 acres of federal oil and gas mineral estate in the Carlsbad Resource Area. Under this alternative:

Approximately 3,942,981 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District." The total acreage includes controlled surface use restrictions and approximately 162,822 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. Refer to Tables 8 and 43, and Map 16.

Approximately 65,007 acres (2 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 8 and 44, and Map 16. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 87,012 acres (2 percent) would be closed to leasing to protect special resources or to support other public uses. See Tables 8 and 45, and Map 16. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

TABLE 43
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
CARLSBAD RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
City of Carlsbad Water Well Field	29,520		
East Guadalupe Escarpment Habitat Management Area		25,600	
Subtotal	29,520	25,600	
OTHER AGENCY MANAGEMENT:			
Air Base City, Hobbs Industrial Air Park	160		
Artesia Airport	200		
Carlsbad Airport	160		
Jal Airport	280		
Lincoln National Forest	N/A[2]		
Subtotal	800		
Total	30,320	25,600	

[1] Includes areas described in "Management Common to All Alternatives."

[2] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 44
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
CARLSBAD RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
Black River Buckwheat Population Area	720		
Chosa Draw ACEC	2,820		
CP Hill Buckwheat Population Area	360		
Laguna Plata Archaeological District	3,360		
Maroon Cliffs Archaeological District	1,880		
McKittrick Hill Caves	5,240		
Pecos River/Canyon ACEC/RNA[2]	4,465		
Pope's Well	80		
Poco Site	265		
Seven Rivers Hills HMA	540		
South Texas Hill Canyon RNA		3,600	
Yeso Hills RNA	557		
Subtotal	20,287	3,600	
OTHER AGENCY MANAGEMENT:			
Avalon Reservoir	14,800		
Brantley Lake State Park	10,000		
Brantley Reservoir	14,800		
Lincoln National Forest	N/A[3]		
Living Desert State Park	1,520		
Subtotal	41,120		
Total	61,407	3,600	

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-1 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1] Includes areas described in "Management Common to All Alternatives."

[2] Acreage increased by 40 acres over Alternative A to accommodate T&E species habitat.

[3] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 45
AREAS CLOSED TO FUTURE LEASING
CARLSBAD RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Cave Protection Zones (Dark Canyon)	10,120		
Devils Den WSA	320		
Little Walt Canyon Quarry Site	40		
Lonesome Ridge WSA[2]	1,060		
McKittrick Canyon WSA	200		
Mudgetts WSA[3]	1,060		
Subtotal	12,800		
OTHER AGENCY MANAGEMENT:			
Carlsbad Caverns National Park/Wilderness	46,530		
Gnome Site	680		
Lincoln National Forest	26,282		
State Militia Site	720		
Subtotal	74,212		
Total	87,012		

[1] Includes areas described in Management Common to all Alternatives.

[2] The 2,990-acre Lonesome Ridge ACEC is within the Lonesome Ridge WSA. The ACEC would remain closed to leasing even if the WSA is not designated as wilderness.

[3] Acreage shown is that part of the WSA outside the cave protection zones, which would become available for future leasing if the WSA is not designated as wilderness.

Source: BLM files, 1994.

In the Carlsbad RMP, a number of areas were designated as special management areas. A variety of management practices were prescribed, including oil and gas stipulations. The use of the Surface Use and Occupancy Requirements, and reliance on off-road vehicle designations and visual resource management prescriptions established in the Carlsbad RMP make the continued use of oil and gas leasing stipulations unnecessary on the following areas:

Blue Spring
Bogle Flat Spring
Little McKittrick Draw HMA
Owl Spring
Preservation Spring
Southern Gypsum Soil Area
Lesser prairie chicken habitat areas
Heron rookeries
Ben Slaughter Draw
Bluntnose Shiner HMA
Cottonwood Spring
Fence Canyon Caves
Honest Injun Cave
KFF Caverns
Lost Cave
Pecos River Corridor
Yellow Jacket/Lair Caves

Existing oil and gas leasing stipulations for these areas would no longer be used under this alternative. The proposed changes are summarized in Table 21. Other management prescribed in the Carlsbad RMP for these areas would not change, and these areas would still be managed as special management areas. If needed, standardized lease notices would be used to provide information about OHV and VRM requirements to purchasers of leases.

The Maroon Cliffs Archeological District would remain unchanged from its current configuration and management. Refer to Table 44 and Map 17.

ROSWELL RESOURCE AREA

The BLM administers approximately 9,740,000 acres of federal oil and gas mineral estate in the Roswell Resource Area. Under this alternative:

Approximately 9,316,013 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District". This total includes controlled surface use restrictions and approximately 935,000 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. See Tables 13 and 46, and Map 11.

TABLE 46
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
Santa Rosa Municipal Airport	320		
Melrose Bombing Range, buffer area	1,000		
Total	1,320		

[1] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

Approximately 56,903 (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 13 and 47, and Map 11. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 367,084 acres (4 percent) would be closed to leasing to protect resources or to support other public uses. See Tables 13 and 48, and Map 11. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

Locatable Minerals

Goal: Continue to keep lands available to locatable minerals while maintaining important environmental values.

The areas summarized in Table 49 and shown on Map 9 would be withdrawn from all forms of entry under the public land laws, including the general mining laws.

Solid Leasable Minerals

Goal: Keep lands available for leasing and production, while maintaining important environmental values.

Lands in the following area would remain closed to leasing:

- Mathers Research Natural Area, 242 acres

Additional public lands that would be closed to solid mineral leasing are summarized in Table 50 and are shown on Map 19.

Saleable Minerals

Goal: Provide mineral materials to the public while maintaining the protection necessary to prevent adverse environmental impacts and to minimize impacts to public health and safety.

Existing pit locations would not be closed until material is depleted unless it has been determined that the pit is causing undue and unnecessary environmental degradation. Pits closed would be reclaimed to standards that would conform to, or improve, the condition of the surrounding ecosystem.

All federal mineral estate at Fort Stanton would be open to the disposal of mineral materials.

The areas that would be closed to mineral material disposals to preclude surface disturbance are summarized in Table 51 and are shown on Map 20.

LANDS AND REALTY MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Utility and Transportation Systems

Areas proposed for exclusion of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 52 and are shown on Map 12. Lands acquired as habitat for Special Status Species or acquired for wetland/riparian values would be added to the right-of-way exclusion area for major projects. Exceptions for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in exclusion zones on a case-by-case basis.

Areas proposed for avoidance of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 53 and are shown on Map 21. Rights-of-way for major projects and for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to

In the Carlsbad RMP, a number of areas were designated as special management areas. A variety of management practices were prescribed, including oil and gas stipulations. The use of the Surface Use and Occupancy Requirements, and reliance on off-road vehicle designations and visual resource management prescriptions established in the Carlsbad RMP make the continued use of oil and gas leasing stipulations unnecessary on the following areas:

Blue Spring
Bogle Flat Spring
Little McKittrick Draw HMA
Owl Spring
Preservation Spring
Southern Gypsum Soil Area
Lesser prairie chicken habitat areas
Heron rookeries
Ben Slaughter Draw
Bluntnose Shiner HMA
Cottonwood Spring
Fence Canyon Caves
Honest Injun Cave
KFF Caverns
Lost Cave
Pecos River Corridor
Yellow Jacket/Lair Caves

Existing oil and gas leasing stipulations for these areas would no longer be used under this alternative. The proposed changes are summarized in Table 21. Other management prescribed in the Carlsbad RMP for these areas would not change, and these areas would still be managed as special management areas. If needed, standardized lease notices would be used to provide information about OHV and VRM requirements to purchasers of leases.

The Maroon Cliffs Archeological District would remain unchanged from its current configuration and management. Refer to Table 44 and Map 17.

ROSWELL RESOURCE AREA

The BLM administers approximately 9,740,000 acres of federal oil and gas mineral estate in the Roswell Resource Area. Under this alternative:

Approximately 9,316,013 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District". This total includes controlled surface use restrictions and approximately 935,000 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. See Tables 13 and 46, and Map 11.

TABLE 46
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
Santa Rosa Municipal Airport	320		
Melrose Bombing Range, buffer area	1,000		
Total	1,320		

[1] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

Approximately 56,903 (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 13 and 47, and Map 11. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 367,084 acres (4 percent) would be closed to leasing to protect resources or to support other public uses. See Tables 13 and 48, and Map 11. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

Locatable Minerals

Goal: Continue to keep lands available to locatable minerals while maintaining important environmental values.

The areas summarized in Table 49 and shown on Map 9 would be withdrawn from all forms of entry under the public land laws, including the general mining laws.

Solid Leasable Minerals

Goal: Keep lands available for leasing and production, while maintaining important environmental values.

Lands in the following area would remain closed to leasing:

- Mathers Research Natural Area, 242 acres

Additional public lands that would be closed to solid mineral leasing are summarized in Table 50 and are shown on Map 19.

Saleable Minerals

Goal: Provide mineral materials to the public while maintaining the protection necessary to prevent adverse environmental impacts and to minimize impacts to public health and safety.

Existing pit locations would not be closed until material is depleted unless it has been determined that the pit is causing undue and unnecessary environmental degradation. Pits closed would be reclaimed to standards that would conform to, or improve, the condition of the surrounding ecosystem.

All federal mineral estate at Fort Stanton would be open to the disposal of mineral materials.

The areas that would be closed to mineral material disposals to preclude surface disturbance are summarized in Table 51 and are shown on Map 20.

LANDS AND REALTY MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Utility and Transportation Systems

Areas proposed for exclusion of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 52 and are shown on Map 12. Lands acquired as habitat for Special Status Species or acquired for wetland/riparian values would be added to the right-of-way exclusion area for major projects. Exceptions for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in exclusion zones on a case-by-case basis.

Areas proposed for avoidance of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 53 and are shown on Map 21. Rights-of-way for major projects and for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to

TABLE 47
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Alleged UFO Crash Sites[2]	1,120		2,560
Billy the Kid Recreation Site	80		
Border Hill NNL		150	
Cocklebur Lakes Archaeological District	3,000		
Garnsey Bison Kill Site	520		
Haystack Butte Archaeological District	4,067		
Haystack Mountain OHV Area	4,153		
Mescalero Sands ACEC	7,931		
Mescalero Sands North Dune OHV Area	1,153		
North Pecos River ACEC	4,200		
Overflow Wetlands ACEC	1,040		
Roswell Cave Complex ACEC	12,654	1,600	640
Valley of Fires Recreation Area		463	
Subtotal	39,918	2,213	3,200
OTHER AGENCY MANAGEMENT:			
Cibola National Forest			N/A[3]
Fort Sumner Reservoir Project and Sumner Lake State Park	11,240		
Lincoln National Forest			N/A[3]
Tucumcari Project	7		
Ute Lake State Park	325		
Subtotal	11,572		
Total	51,490	2,213	3,200

Notes: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-2 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

[3] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 48
AREAS CLOSED TO FUTURE LEASING
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
Fort Stanton ACEC			27,622
Carrizozo Lava Flow and Little Black Peak WSAs	25,312		
Mathers Research Natural Area	242		
Subtotal	242	25,312	27,622
OTHER AGENCY MANAGEMENT:			
Bitter Lake National Wildlife Refuge	6,320		
Bottomless Lakes State Park	460		
Cibola National Forest			19,178
Grulla National Wildlife Refuge	69		
Lincoln National Forest			99,171
Melrose Bombing Range, core area	6,714		
White Sands Missile Range		180,756	
Salt Creek Wilderness	1,240		
Subtotal	14,803	180,756	118,349
Total	15,045	206,068	145,971

[1] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

TABLE 49
AREAS WITHDRAWN FROM MINERAL ENTRY
ROSWELL RESOURCE AREA
ALTERNATIVE C

Area[1]	Estimated Mineral Acreage
BLM MANAGEMENT:	
Alleged UFO Crash Sites[2]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	120
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area (staging area)	160
Mathers Research Natural Area	242
Mescalero Sands ACEC[3]	7,931
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	700
Roswell Cave Complex ACEC[4]	14,894
Spring and Seep Areas	240
Valley of Fires Recreation Area	463
Subtotal	92,194
OTHER AGENCY MANAGEMENT:	
Blackwater Draw Archaeological Site	711
Canal Right-of-Way (NM 21834)	7
Melrose Bombing Range, core area	6,714
Nike Hercules Defense Site	325
NM Army National Guard Training Site	53
Fort Sumner Dam and Sumner Lake State Park	8,123
Tucumcari Project, Conchas Canal (NM 52398)	7
Two Rivers Reservoir Project	2,590
Subtotal	18,530
Total	110,724

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[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

[3] May include as many as 6,617 acres originally in the Mescalero Sands Recreation Complex.

[4] Includes original 40-acre withdrawal on Torgac Cave.

Source: BLM files, 1994.

TABLE 50
AREAS CLOSED TO SOLID MINERAL LEASING
ROSWELL RESOURCE AREA -- ALTERNATIVE C

Areas[1]	**Estimated Mineral Acres**
Alleged UFO Crash Sites[2]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	120
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	6,872
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,931
Mescalero Sands North Dune OHV Area	1,705
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	700
Roswell Cave Complex ACEC	14,894
Valley of Fires Recreation Area	463
Total	100,371

[1] Includes areas described in "Management Common to All Alternatives."
[2] Two alleged sites.

Source: BLM files, 1994.

TABLE 51
AREAS CLOSED TO THE DISPOSAL OF MINERAL MATERIALS
ROSWELL RESOURCE AREA -- ALTERNATIVE C

Areas	**Estimated Mineral Acres**
Alleged UFO Crash Sites[1]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL 150	
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Garnsey Bison Kill Site	120
Feather Cave Archaeological Complex	330
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	3,500
Roswell Cave Complex ACEC	14,894
Overflow Wetlands ACEC	700
Mescalero Sands ACEC	7,931
Mathers Research Natural Area	242
Mescalero Sands North Dune OHV Area	1,136
North Pecos River ACEC	1,520
Valley of Fires Recreation Area	463
Total	66,458

[1] Two alleged sites.

Source: BLM files, 1994.

TABLE 52
RIGHTS-OF-WAY EXCLUSION AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas Estimated	Acres
Border Hill Zone NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Fort Stanton ACEC	24,630
Mathers Research Natural Area	242
Overflow Wetlands ACEC	700
Rio Bonito[1/]	2,000
U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)	76
Valley of Fires Recreation Area	463
Total	53,573

[1/] Includes the Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

TABLE 53
RIGHTS-OF-WAY AVOIDANCE AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas		Estimated Acres
Alleged UFO Crash Sites[1/]		3.680
Cocklebur Lakes Archaeological District	3,000	
Core Prairie Chicken Habitat Areas	245,000	
Fort Stanton ACEC		24,630
Garnsey Bison Kill Site		120
Haystack Butte Archaeological District	3,400	
Haystack Mountain OHV Area (applies to overhead power and telephone lines)		4,153
Mescalero Sands ACEC		7,888
Mescalero Sand North Dunes OHV area (applies to overhead power and telephone lines)	1,136	
North Pecos River ACEC		3,360
Overflow Wetlands ACEC		2,300
Roswell Cave Complex ACEC		14,894
Total		313,561

[1/] Two alleged sites.

Source: BLM files, 1994.

oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in avoidance zones on a case-by-case basis.

No additional rights-of-way corridors would be designated.

See management common to all alternatives for a description of the existing corridor.

Acquisition

Over the life of the plan, the acquisition of an estimated 56,000 acres of non-federal lands or interests in non-federal lands would be considered on a case-by-case basis to achieve management objectives. The lands summarized in Table 54 and described in Appendix 9 are currently identified as being suitable for consideration for acquisition as opportunities become available. Any lands acquired would be managed according to the management prescriptions in this alternative.

Easements would be acquired to provide access to public lands for recreation, wildlife, range, cultural/historical, mineral, ACEC, special management area and other resource needs, as opportunities arise. Criteria for the acquisition of easements are described in Appendix 8.

Easements are needed in the following areas:

Overflow Wetlands WHA
Crockett Cave
Crystal Cave
Millrace Cave
Little Black Peak Cinder Cone east access
Little Black Peak Cinder Cone west access
Carrizozo Lava Flow WSA lower windmill east access
Mescalero Sands ACEC east access
Mescalero Sands ACEC west access

TABLE 54
LANDS CONSIDERED SUITABLE FOR POTENTIAL ACQUISITION
ROSWELL RESOURCE AREA
ALTERNATIVE C

Areas[1]	Private	State
Carrizozo Lava Flow and Little Black Peak WSAs	5,512	4,321
Fort Stanton Area		1,320
Haystack Butte Archaeological District	40	640
Haystack Mountain OHV Area	1,200	1,453
Mescalero Sands ACEC	320	1,800
Mescalero Sands North Dune OHA Area	410	
Overflow Wetlands ACEC	960	
Rio Bonito[2]	1,018	1,982
Roswell Cave Complex ACEC	4,920	
Total	14,380	11,516

[1] Includes areas described in "Management Common to All Alternatives."

[2] Includes Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

LIVESTOCK GRAZING MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Rangeland improvements and vegetation treatments would continue to be implemented to improve or maintain forage production and range condition, in an effort to achieve the Desired Plant Community. Livestock production would be emphasized.

The stocking rate of sheep in the Macho WHA in areas currently supporting antelope would not exceed an average of 65 sheep per section per allotment over the course of the grazing year.

VEGETATION MANAGEMENT

Goal: Manage resources to maintain or improve vegetation with the emphasis on watershed protection and forage for livestock.

Alternative C would be the same as Alternative B, with the exceptions of practices and constraints proposed for use in meeting the management objectives and DPC. These exceptions are listed below. Constraints specific to one community are listed with that community. Management proposed for the Mixed Shrub Malpais and Riparian communities, and the Rio Bonito Acquired Lands are the same as Alternative B and is not repeated here.

The development of projects as a means of meeting a DPC would be based on the thresholds and vegetation condition objectives described in Alternative B. The standard practices that could be employed to meet a DPC would be based on thresholds and vegetation condition objectives described below for each community type. The specific practices to be used and the numbers of acres affected would be determined during activity planning, based on the results of resource monitoring. During activity planning, specific resource condition objectives would be developed for a distinct area (e.g., an allotment) based on the planned use of the area and the more general vegetation condition objectives developed in this land use plan.

The standard practices that would be employed to meet management objectives in each community are:

- Utilization levels not exceeding 50 percent of annual plant production. Utilization levels would be determined prior to green-up, and measured on key forage species.
- Projects such as fences, water developments, erosion control structures, reseedings, or vegetative sales.
- Grazing treatments such as changes in season of use, class of livestock, or stocking rates.
- Vegetation treatments, including prescribed fire or prescribed natural fire; fuelwood sales; and chemical, biological or mechanical controls.

Constraints on treatments in each community are:

- A project area would not be chemically treated until the chemical treatment of an adjacent project area has been in place at least three years.

Grassland Community

Constraints on treatments in the grassland community are:

- The requirement that vegetation composition in any given pasture include at least 10 genera of fall forbs preferred by pronghorn antelope does not apply to this alternative (see Table 34).

Shinnery Oak-Dune Community

Refer to the standard practices and constraints listed above.

Pinon-Juniper Grassland Community

Constraints on treatments in the pinon-juniper community are:

- Removal of trees would be done to create edge and mosaic patterns.

Mixed Desert Shrub Community

Refer to the standard practices and constraints listed above.

Drainages, Draws and Canyons Community

Constraints on treatments in the drainages, draws and canyons community are:

- Browse species would be protected.
- Riparian-wetland vegetation would be protected by methods such as developing riparian pastures, establishing upland waters, and conducting salt cedar control.

CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Goal: Protect only those cultural properties that are mandated by law and to the minimal degree of protection allowed by law.

Cultural sites would be managed for the purposes of interpretation and for gaining knowledge of the past. Approximately five percent of the recorded archeological sites in the resource area would be managed for conservation. The management objective for conservation would be to preserve existing archeological values. This would be achieved by protecting sites from damage by natural processes such as erosion and from man-caused damage such as pot hunting and surface disturbing activities. The Paleoindian sites, such as those in the Haystack Butte area would fall into this category.

Approximately five percent of the recorded archeological sites in the resource area would be managed to emphasize public values and interpretation. The management objective for public values and interpretation would be to develop archeological properties for public use. This would be achieved by scientifically treating a site, such as by excavation and developing exhibits so that the cultural property is interpreted for public recreation and education. The Garnsey Bison Kill site near Bottomless Cave near Fort Stanton are two sites that would lend themselves to interpretation.

Approximately 90 percent of the recorded archeological sites would be managed for information use. Management would emphasize the use of cultural properties for the purpose of gaining knowledge. This would be achieved by scientifically studying the property in whatever ways are appropriate in order to extract as much information as possible. Two sites which are currently being studied are the Upper Bonito I and Lower Stanton Ruin.

With regard to the proposed 3,400-acre Haystack Butte National Register Archeological District, the following management would be applied. (See Tables 47, 49, 50, 51, 53, and 55.)

- oil and gas: open to leasing with "no surface occupancy"
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: avoidance area for major rights-of-way
- OHV designations: OHV use limited to designated roads and trails

With regard to the proposed 3,000-acre Cocklebur Lakes National Register Archeological District, the following management would be applied. (See Tables 47, 49, 50, 51, 53, and 55.)

- oil and gas: open to leasing with "no surface occupancy"
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: avoidance area for major rights-of-way

TABLE 55
OFF-HIGHWAY VEHICLE MANAGEMENT DESIGNATIONS ROSWELL RESOURCE AREA ALTERNATIVE C

Designation	Areas[1]	Acres
Closed	Alleged UFO Crash Sites[2]	3,680
	Border Hills NNL	150
	Carrizozo Lava Flow and Little Black Peak WSAs	25,312
	Comanche Hill "A" Area	660
	Comanche Hill "C" Area	240
	Garnsey Bison Kill Site	120
	Fort Stanton ACEC: Rio Bonito and Salado Creek Areas	250
	Fort Stanton ACEC: Trails (115 miles)	56
	Mathers RNA	242
	Playa and Alkali Lakes	2,000
	Roswell Cave Complex ACEC[3]	500
	Springs and Seeps	240
Total Closed		33,450
Limited Designated Roads/Trails	Cocklebur Lakes Archaeological District	3,000
	Dunahoo Hills (ATVs less than 50 inches)	640
	Fort Stanton ACEC	24,324
	Haystack Butte Archaeologcial District	3,400
	Haystack Mountain OHV Area (ATVs less than 50 inches)	4,173
	Mescalero Sands ACEC	7,888
	North Pecos River ACEC	3,360
	Pecos River Floodplain	19,200
	Overflow Wetlands ACEC	3,000
	Remainder of Resource Area	1,373,062
	Rio Bonito Acquired Lands	1,100
	Roswell Cave Complex ACEC	11,394
	Valley of Fires Recreation Area	463
Total Limited		1,455,004
Open	Mescalero Sands North Dune OHV Area	1,546
Total Open		1,546

[1] Includes areas identified in "Management Common to All Alternatives."

[2] Two crash sites.

[3] Includes additional 480 acres that fall within the Carrizozo Lava Flow and Little Black Peak WSAs OHV closures that are not reflected in cave ACEC closures summary.

Source: BLM files, 1994.

- OHV designations: OHV use limited to designated roads and trails

With regard to the 120-acre Garnsey Bison Kill Site, management would include development of an interpretive site. One management goal would be to allow the public to see an archeological-paleontological site exposed in the sides of the arroyo running through the site. Some of the site would be stabilized, protecting the archeological and paleontological values. Another goal would be to generate appreciation of archeology and paleontology by developing a trail with interpretive signs and markers, and other on-site and off-site interpretive techniques. Other development of the site could include site stabilization, exhibits, an interpretive shelter, rest rooms, and a parking area. The following management actions would be employed in management of the site:

- oil and gas: open to leasing with "no surface occupancy"
- locatable minerals: withdraw from entry
- solid leasable minerals: close to leasing
- saleable minerals: close to disposal
- rights-of-way: exclusion area for major rights-of-way
- livestock grazing: closed
- OHV designations: closed to OHV use

There has been considerable interest in trying to identify the location for the alleged 1947 UFO crash site(s). If such an event was determined to have occurred on BLM-administered land, the BLM would interpret and protect the area(s) by:

- rights-of-way avoidance;
- withdrawing the lands from mining claim location;
- closing the lands to solid mineral leasing;
- closing the lands to disposal of mineral materials;
- leasing oil and gas with no surface occupancy stipulations; and
- closing the lands to OHV use.

The site(s) would be retained in federal ownership. Access and interpretive facilities would be established.

OUTDOOR RECREATION MANAGEMENT

Recreation Management

Goal: Manage recreation resources to emphasize intensive use of roaded natural and rural recreation opportunities, while providing environmental protection of ecosystems.

The Mescalero Sands ACEC, Fort Stanton ACEC, Overflow Wetlands ACEC, Roswell Cave Complex ACEC, Mescalero Sands North Dunes OHV Area, Haystack Mountain OHV Area, Garnsey Bison Kill Site, Rio Bonito acquired lands, Billy the Kid Recreation Site and Valley of Fires Recreation Area would be designated Special Recreation Management Areas (refer to Map 23). The public lands not designated Special Recreation Management Areas would be designated an Extensive Recreation Management Area (ERMA).

Lands acquired along the Rio Bonito near Lincoln (Tracts 1-4) would be managed for facility-based, intensive recreational use. Recreation activities that would be emphasized are fishing, nature viewing and trail hiking. The development of two small day-use areas on Tracts 1 and 4 would be considered. Development at these sites would include graveled access roads and parking areas, tables and grills, and restroom facilities. If Tract 5 is acquired, future intensive development would be considered, including the possible development of a full-service campground of 25 to 50 sites. Livestock grazing would be excluded from the Tract 5 site.

The Billy The Kid Recreation Site (80 acres of BLM-administered land) would be managed and developed for a day-use area, with emphasis on providing access to the Pecos River and fishing. Development could include trails, picnic sites, roads and interpretive displays. Livestock grazing would be excluded from the site.

The Garnsey Bison Kill Site would be managed as an outdoor archaeological and paleontological classroom with emphasis on cultural and natural resource protection. Development could include exhibits, stabilization, self-guided interpretive trails, interpretive shelter and stations, a parking area, signs and brochures, and restroom facilities.

An 86-mile Back Country Byway would be developed from Roswell to Capitan along State Highway 246, the Pine Lodge Road. Additional byways would be identified and evaluated for future designation and development. Future designations would be considered for roads or trails having high scenic value, unique geologic formations, botanical or biological features, historical or archaeological features, water attractions or other features with high public value.

The area listed below and in Table 48 would be closed to the leasing of oil and gas.

- Mathers Research Natural Area

The areas listed below and in Table 47 would be open to the leasing of oil and gas with "no surface occupancy."

- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV Area
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 49 would be proposed for withdrawal from entry or appropriation under the public land laws, including the general mining laws.

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Haystack Mountain OHV Area (staging area)
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 50 would be closed to the leasing of solid minerals.

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Haystack Mountain OHV Area
- Valley of Fires Recreation Area
- Mescalero Sands North Dune OHV Area
- Billy the Kid Recreation Site

The areas listed below and in Table 51 would be closed to the disposal of mineral materials (saleable minerals).

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV Area
- Mathers Research Natural Area
- Billy the Kid Recreation Site
- Valley of Fires Recreation Area

The areas listed below and in Table 52 would be excluded from major rights-of-way.

- Rio Bonito acquired lands
- Mathers Research Natural Area
- Valley of Fires Recreation Area
- U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)
- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL

The areas listed below and in Table 53 would be avoided when locating major rights-of-way.

- Mescalero Sands North Dune OHV area (applies to overhead power and telephone lines)
- Haystack Mountain OHV area (applies to overhead power and telephone lines)

Cave and Karst Resource Management

Goal: Protect cave values while allowing for liberal recreational, commercial, educational, research and scientific uses.

Visitor use limits and permit systems would be enforced on all gated or fragile caves. Seasons of use and visitor use restrictions would be established on other caves or portions of caves that are found to have significant bat hibernacula or nurseries.

Surface use and occupancy would be controlled within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Refer to Appendix 3 for more information on this restriction.

Off-Highway Vehicle (OHV) Management

Goal: Manage OHV use to provide adequate access and reduce adverse impacts on sensitive resource values. Provide quality recreational opportunities for OHV users in conjunction with demand and safety concerns.

Inventories, public review, and transportation planning would be conducted to support road-by-road designations for roads and trails suitable for off-highway vehicle use. Proposed designations are listed in Table 55 and shown on Map 14. All roads and trails not otherwise categorized would be designated limited to existing roads and trails for off-highway vehicle use. Pending completion of formal designations, all roads and trails would be managed as limited to existing roads and trails for off-highway vehicle use.

The Mathers RNA (242 acres) would be closed to off-highway vehicle use, except for two existing roads, which would be classified as limited to designated roads or trails.

Public lands within the present boundaries of the Carrizozo Lava Flow and Little Black Peak WSAs (25,321 acres) would be designated closed to off-highway vehicle use to protect outstanding semi-primitive values. Any state or private lands acquired within the present boundaries of the WSA's would be designated closed to OHV use. Public land and acquired state or private lands adjacent to the WSAs would be designated limited to designated roads and trails for OHV use to provide access and limit impacts to fragile soils and vegetation.

The Mescalero Sands North Dune OHV Area would be enlarged to approximately 1,546 acres, and would be designated open and managed for intensive OHV use, with emphasis on providing a quality play area for OHV's. Approximately 410 acres of private land would be considered for acquisition. Planned upgrades and development include interpretive/safety displays with emphasis on the National Tread Lightly Program, sun shelters, rest rooms and potable water.

Haystack Mountain OHV Area would be enlarged to approximately 6,826 acres, and would be managed as an OHV Intensive Use Area and designated limited to designated roads for all-terrain vehicles less than 50 inches in width. Approximately 1,453 acres of state lands and 1,200 of private lands would be considered for acquisition. Non-motorized use of Haystack Mountain OHV Area would be allowed. Facilities would be considered for development, such as rest rooms, sun shelters, trails, interpretive displays and picnic sites.

Approximately 463 acres in the Valley of Fires Recreation Area would be designated limited to designated roads and trails for off-highway vehicle use.

The Rio Bonito acquired lands (Tracts 1-5) would be designated limited to designated roads and trails for off-highway vehicle use to protect riparian values.

The 150-acre Border Hills Structural Zone National Natural Landmark would be designated closed to off-highway vehicle use.

Approximately 120 acres of the 360 federal acres at the Garnsey Bison Kill site (the core area) would be designated closed to off-highway vehicle use to protect the archaeological and paleontological sites. The remaining 240 federal acres and any acquired lands would be designated limited to designated roads and trails to protect the watershed above the bison kill site. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

Approximately 3,000 acres in the proposed Cocklebur Lakes National Register Archeological District and about 3,400 acres in the proposed Haystack Butte National Register Archeological District would be designated limited to designated roads and trails for off-highway vehicle use.

Following inventory, if it is deemed necessary to protect a significant cave from OHV impacts, a cave exclosure would be constructed and the area within the enclosure would be designated closed to off-highway vehicle use.

A 640-acre OHV area in the Dunahoo Hills northeast of Roswell would be established, if demand warrants, and be designated limited to all-terrain vehicle use.

Approximately 19,200 acres of public lands along both sides of the Pecos River would be designated limited to designated roads and trails for OHVs to protect the floodplain, riparian zone and wetlands.

Approximately 2,000 acres encompassing 56 playas and alkali lakes would be designated closed to off-highway vehicle use.

Approximately 640 acres encompassing the area within 200 meters of the source of about 20 springs or seeps, or within downstream riparian areas created by flows from the source or resulting from riparian area management, would be designated closed to off-highway vehicle use.

Visual Resource Management

Painting would be required of all permanent surface facilities or equipment approved by the BLM in Class II Visual Resource Management zones. Painting of facilities or equipment also would be required in Class III VRM zones in the foreground view areas of paved roads, non-paved county roads, BLM back-country byways, and other areas determined by NEPA analysis to need painting to reduce visual impacts. The color 'Carlsbad Canyon' normally would be used. Refer to Appendix 3 for more discussion of this topic.

WATERSHED MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Soil Management

Best Management Practices (BMPs) would be used to minimize sedimentation as a cause of nonpoint source pollution in surface waters. The BMPs, base on standard operating procedures, oil and gas lease stipulations or BLM policy, would be specified in activity plans for actions that make soils more susceptible to erosion, or which impair soil productivity. A strong emphasis would be placed on the economic impact of the BMPs. Activities requiring implementation of BMPs would include, but would not be limited to:

- soil disturbing activities that result in soil loss due to accelerated wind or water erosion;
- activities that reduce vegetative cover, thus exposing the soil to erosion processes, and reducing the amount of soil organic matter and soil productivity;
- activities that tend to concentrate surface runoff or steepen hydraulic gradients, thus increasing soil erosion by flowing water;
- activities that result in sediment loading directly to streams;
- activities that damage soil structure by compaction or other means; and
- activities that degrade the physical, chemical, or biological properties of the soil, such as high-intensity burns, contamination by toxic substances, or other means.

No occupancy or use would be allowed on slopes over 30 percent, except if a plan of operations and development which provides for adequate mitigation of impacts were approved by the Authorized Officer. Occupancy or use of fragile soils would be considered on a case-by-case basis.

Surface Water Management: Quantity

As part of the watershed management plans to be prepared for six watersheds, site-specific prescriptions would be written which could include, but not be limited to, the following practices: (1) mechanical, chemical or prescribed fire vegetation treatments; (2) plantings of native riparian plant species and seeding of herbaceous ground cover; (3) livestock grazing management by controlling livestock numbers and season of use, and by providing alternative water and mineral sources; (4) construction of erosion, sediment and flood control structures; (5) use of other methods determined most suitable for site-specific conditions; (6) implementation of a monitoring program, including a feedback loop which would guide management based on monitoring information.

Surface Water Management: Quality

Further degradation of water quality would be prevented whenever practicable to meet present or possible future demands, such as domestic or municipal water supplies, irrigation, livestock and wildlife, recreation, aquatic and riparian habitat, and other uses. Water quality standards more stringent than state and federal standards would not be imposed if an increased economic cost would be incurred.

Groundwater Management

Further degradation of groundwater quality would be prevented whenever practicable, even when WQCC standards allow for further degradation. Exceptions would be considered for areas specifically exempted by state or federal authority, or when standards more stringent than state and federal standards would result in increased economic costs being incurred.

For any site proposed for pesticide treatment, the potential for groundwater contamination would be evaluated with the EPA rating system, DRASTIC (Aller et al. 1985). If the site proposed for treatment has a DRASTIC index greater than 100, it has a moderate to high potential for groundwater contamination, and would require a more detailed analysis prior to a decision being made on the proposed treatment. Factors that would be studied further include: pesticide solubility, mobility, speciation, and degradation, and highly localized recharge areas.

WILDLIFE HABITAT MANAGEMENT

Special Status Species Habitat Management

Goal: Provide protection and recovery for all Special Status Species, which are federal and state listed species, and federal candidate species. Conserve all occupied habitat for these species on public land. Mitigation will only meet the minimum values outlined in applicable regulations and laws.

U.S. Fish and Wildlife Service Recovery Plans would be implemented that would not constrain mineral development and production, including the reintroduction of native special status species in suitable areas on public land in coordination and cooperation with local governments. Current plans cover the American peregrine falcon, bald eagle, Pecos gambusia, Kuenzler hedgehog cactus, Pecos bluntnose shiner and Black-footed ferret.

Big Game/Upland Game Habitat Management

Goal: Maintain or improve big game and upland game habitat areas to provide for existing populations of big game and upland game species on public land.

Prescribed burns would be conducted in selected pinon-juniper community types at Fort Stanton and the Cedar Hills area west of Roswell. For each prescribed burn the acreage to be burned and the objective of the fire would be tied to wildlife habitat management and desired plant community management objectives described in activity plans.

No surface occupancy would be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects. Refer to Appendix 3 for more discussion of this restriction.

Big game and upland game transplants or reintroductions on public lands would be conducted when cooperatively prescribed by the BLM and the NMDGF. Projected transplants or reintroductions include, but are not limited to:

- Pronghorn antelope in pastures that meet the suitability criteria (Appendix 12);
- Mule deer in areas of low population density or in areas to enhance deer herd gene pools;
- Wild turkey at Ft. Stanton and on the Rio Bonito acquired lands;
- Other big game or upland game species recommended by the New Mexico Department of Game and Fish.

Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in lesser prairie chicken habitat during the period of April 1 through May 31, each year. Refer to Appendix 3 for more discussion of these restrictions.

Core prairie chicken habitat areas would be avoided when locating major rights-of-way. Refer to Table 53 and Map 21.

Waterfowl Habitat Management

Goal: Maintain current wetland habitat to provide seasonal habitat for waterfowl within the Central Flyway.

Develop as many as 400 acres of wetland habitat in suitable areas within the floodplain of the Pecos River where development would not conflict with oil and gas production. Suitability criteria include but are not limited to:

- Areas with seasonal surface waters indicative of a high water table or subsurface clay layer;
- Areas with the potential of supporting cottonwood tree groves;
- Areas that have had or would undergo vegetation manipulation projects (e.g., salt cedar control, prescribed fire, riparian pasture development).

No surface occupancy would be allowed within up to 200 meters of active heronries. Refer to Appendix 3 for more discussion on this restriction.

Agricultural practices would be used to provide forage for wildlife habitat on the lands acquired along the Rio Bonito. These practices may include but are not limited to:

- Share cropping of valuable foods (alfalfa, winter wheat, barley, pasture grasses) with a portion left as a standing crop for wildlife;
- Seasonal flood irrigation;
- Construction of irrigation ponds and wells;
- Construction of riparian pastures for livestock grazing management, if appropriate, that benefits riparian area management and wildlife habitat needs.

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan.

Raptor Habitat Management

Goal: Maintain current raptor habitat conditions on public lands.

Raptor nesting and wintering areas would be protected on a case-by-case basis on about 926,000 acres of public lands in the Macho, Caprock, Fort Stanton and Overflow Wetland wildlife habitat areas, and along the Pecos River. Management emphasis for protection and enhancement of habitat would be focused on known key raptor areas and those identified in the future. Management practices could include constructing protective exclosures around tree groves and sinkholes, and raptor nesting platforms.

Fisheries and Aquatic Habitat Management

Goal: Protect and enhance aquatic habitat and associated natural diversity and distribution patterns of native nongame and sport fish, invertebrates, and aquatic mammals, while allowing for mineral development and production that would not degrade aquatic habitat.

Construction of streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection would be allowed for the Rio Bonito, Salado Creek and the Pecos River where there would be no conflict with mineral development and production. Criteria for consideration include, but are not limited to, areas that:

- Exhibit streambank sloughing;
- Lack riparian vegetation or regeneration;
- Exhibit invasion of exotic or undesirable plant species;

- Exhibit erosion of side drainages;
- Lack riparian pastures to control livestock use.

Monitor lotic and lentic systems for:

- Compliance with established water quality standards;
- Fish and macroinvertebrate productivity and composition;
- Stream channel substrate condition as it relates to watershed condition;
- Use of water rights, where established.

Native fish and sport fish introductions or transplants would be undertaken in suitable waters located on public land, in coordination with the New Mexico Department of Game and Fish. Proposed introductions include but would not be limited to:

- Rainbow, cutthroat, brown, and brook trout in the Rio Bonito;
- Bass and bluegill in irrigation ponds.

Criteria for suitable waters include, but are not limited to:

- Availability, regime, and security of perennial water;
- No or low populations in stream segments with suitable habitat conditions (water flow, temperature, stream shading, pools & riffles, stable streambanks, water quality, substrate condition, invertebrates);
- Channel dimension and capacity.

Riparian/Wetland and Playa Lake Management

Goal: Provide minimum protection to riparian wetland and playa lake areas. Mitigation would only meet the minimum requirements outlined in applicable regulations and law.

Lands within 200 meters of the source of springs and seeps listed in Appendix 3, and within downstream riparian areas created by flows from the source, or through riparian area management, would be considered for withdrawal from all forms of entry under the public lands laws, including the general mining laws. Areas to be withdrawn would be prioritized according to the following criteria:

- Presence of threatened or endangered species;
- Potential habitat for threatened or endangered species;
- Limited alternative water sources in the area for wildlife and livestock;
- Federal ownership of both surface and subsurface estates;
- Presence of native riparian vegetation.

No surface occupancy would be allowed in playas and alkali lakes, or within up to 200 meters of springs and seeps. Refer to the Surface Use and Occupancy Requirements in Appendix 3 for more discussion on these restrictions.

Springs and seeps, reservoirs, earthen tanks, sinkhole lakes, and playa lakes would be enhanced by constructing protective exclosures, planting native vegetation, establishing vegetation for wildlife cover, controlling undesirable vegetation, constructing supplemental water pipelines to specific sites, and providing off-site livestock water.

FIRE MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions:

Goal: Limit damage to natural resources and to life and property caused by wildfire. Wherever possible, restore fire to its natural role in the ecosystem through the use of prescribed fire. Use prescribed fire as a tool for land treatment to replace or augment the use of chemical and mechanical treatments.

Protection from Wildfire

Caves and karst areas: Fire suppression in cave and karst areas would include protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of heavy equipment to construct fire line within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features.

Steep slopes: Fire lines would not be constructed with bulldozers or other heavy equipment on slopes greater than 30 percent, except to protect life or property.

Beavers help restore and maintain important riparian values.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The boundaries of the ACECs described below have been established based on the presence of resources and opportunities for efficient management, irrespective of land ownership. The inclusion of other ownerships in ACECs is for purposes of disclosure and does not mean those lands would be designated as part of an ACEC, or that the management proposed in this alternative would be applied to those lands. The acquisition of non-federal lands within ACECs is included in the management proposed in this alternative. If non-federal lands are acquired, those lands could then become part of a designated ACEC and be managed according to the management proposed in this alternative, without additional land use planning.

Refer to Map 15 for locations of the proposed ACECs. Refer to Appendix 13 for discussions of relevance and importance criteria for Areas of Environmental Concern. Refer to Appendix 14 for maps that display the differences among the alternatives.

Overflow Wetlands ACEC

The Overflow Wetlands ACEC comprises 6,814 surface acres and 3,000 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 2,987 acres
State land, 1,720 acres
Private land, 2,107 acres

Management Goal:

Protect the biological and scenic values of the Overflow Wetlands Wildlife Habitat Area, which provides critical habitat for threatened or endangered fish species and supports a significant riparian/wetland plant community.

Management Prescriptions:

The management prescriptions for Alternative C are the same as those for Alternative B, with the following exceptions.

About 700 acres of wetlands, 170 acres of buffer around wetlands, and 170 acres of escarpment would be protected by applying "no surface occupancy" restrictions to future oil and gas leases. The remainder of public lands in the ACEC would be open to future leasing with subject to the Surface Use and Occupancy Requirements described in Appendix 3.

About 700 acres would be closed to the disposal of salable minerals and to the leasing of solid minerals, and would be withdrawn from entry under the land laws (including the 1872 Mining Law). These actions would reduce disturbance of the wetlands and surrounding habitat for wildlife species dependent on the area either seasonally (wintering waterfowl) or yearlong (T/E fish).

Major rights-of-way would be excluded on about 700 acres of public land. Major rights-of-way would be avoided on about 2,300 acres. These restrictions would benefit wildlife species dependent on the area either seasonally (wintering waterfowl) or yearlong (T/E fish).

About 960 acres of private land with riparian/wetland values would be acquired if opportunities arise. Any lands acquired would be managed according to the prescriptions of this alternative.

Salt cedar treatment would be conducted on public land in selected riparian/wetland areas using prescribed fire, or mechanical or chemical controls.

Public grazing leases or permits affecting about 3,000 acres of public land currently in Allotments 65060, 65062, and 65069 would be adjusted to improve habitat for wintering waterfowl habitat. Adjustments may include changes in stocking rates and seasons of use, such as reducing year-long grazing to grazing between March 1 and September 30. The grazing lease on Allotment 65041 would be cancelled.

The use of OHVs on about 3,000 acres would be limited to designated roads and trails.

North Pecos River ACEC

The North Pecos River ACEC comprises 6,400 surface acres and 4,200 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 3,360 acres
State land, 1,160 acres
Private land, 1,880 acres

Management Goal:

Protect the biological and scenic qualities of the Pecos River ACEC, which provides critical habitat for T/E fish species and supports a significant riparian plant community.

Management Prescriptions:

The management prescriptions for Alternative C are the same as those for Alternative B, with the following exceptions.

About 4,200 acres of federal minerals would be open to future oil and gas leasing with "No Surface Occupancy".

About 1,520 acres would be closed to the disposal of salable minerals. About 4,200 acres of federal minerals would be closed to the leasing of solid minerals and would be withdrawn from entry under the land laws (including the 1872 Mining Law). The intent of these actions is to eliminate surface disturbance along the Pecos River and in surrounding wildlife habitat.

Public lands in the ACEC would be designated right-of-way avoidance areas for major rights-of-way.

Legal access (easements) to the Pecos River ACEC would be acquired to resolve conflicts and enhance management in situations where existing roads that originate from county or state roads are interrupted by private or state land inholdings. The acquisition of private or state lands within the ACEC would not be pursued.

The use of OHVs would be limited to designated roads and trails on about 3,360 acres.

Salt cedar control would be conducted on about 600 acres of public land in selected riparian-wetland areas, using prescribed fire, or mechanical or chemical controls.

Livestock grazing adjustments would not be made on public lands in the ACEC.

Mescalero Sands ACEC

The Mescalero Sands ACEC comprises 10,007 surface acres and 7,931 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 7,888 acres
State land, 1,799 acres
Private land, 320 acres

Management Goal:

Protect the biological, archaeological and scenic qualities of the Mescalero Sands ACEC, with emphasis on preserving a portion of the shinnery oak-dune community to maintain the biodiversity of the ecosystem.

Management Prescriptions:

The management prescriptions for Alternative C are the same as those for Alternative B, with the following exceptions.

The federal mineral estate in the ACEC would be open to oil and gas leasing with "no surface occupancy."

The ACEC would be designated a right-of-way avoidance area for major rights-of-way to protect active dunes and surrounding habitat.

Livestock grazing would continue to be excluded on about 1,838 acres (30 percent of the total) in the ONA. On parts of the ACEC where livestock grazing would continue, no increase in grazing preference on public lands would be permitted. No additional range improvements or vegetation treatments geared toward livestock production would be permitted in the ACEC. Projects designed for resource enhancement or protection would be considered.

The National Natural Landmark and Outstanding Natural Area designations would not be retained.

The entire ACEC would be designated limited to designated roads and trails for OHV use.

Fort Stanton ACEC

The Fort Stanton ACEC comprises 24,630 surface acres and 27,622 acres of federal mineral estate. The state-owned hospital and prison and the Sierra Blanca Airport within the boundary of the ACEC are not included in the acreage of the ACEC.

Management Goal:

Protect the biological, archaeological and scenic qualities of Fort Stanton.

Management Prescriptions:

The management prescriptions for Alternative C are the same as those for Alternative B, with the following exceptions.

All public lands in Fort Stanton would be open to saleable mineral disposal, except for approximately 330 acres in the Feather Cave Archeological Complex. All public lands in Fort Stanton would remain withdrawn from the general mining laws, and closed to the disposal of leasable minerals and the leasing of oil and gas.

Major rights-of-way would be avoided on about 24,300 acres of public land to protect important plant and animal habitat, significant riparian, wetland and aquatic habitats, and visual quality. Major rights-of-way would be excluded in the 330-acre Feather Cave Archeological Complex.

Livestock grazing would be allowed throughout Fort Stanton, with a grazing season of 9 months or more, except in the Feather Cave Archeological Complex. No grazing preference would be established.

Salt cedar treatments would be conducted on as many as 300 acres of selected riparian/wetland habitat along the Rio Bonito and Salado Creek using prescribed fire, or mechanical or chemical controls.

Two overlooks would be considered for development on the north and south sides of the historical Fort to interpret the history of the Fort's structures and area, in conjunction with the Boots and Saddles initiative.

Approximately 330 acres around the Lower Stanton Ruin and Feather Cave would be managed to preserve, protect and interpret unique archeological values, artifacts and architectural features. The area would be called the Feather Cave Archeological Complex. In addition to the management prescribed for the Fort Stanton ACEC that would also apply to the Archeological Complex, the following specific management actions would be applied, as well:

- recreation development would be considered, such as trails to Lower Stanton ruin and Indian Shelter Cave, signs, an interpretive shelter, rest rooms, and a parking area;

- off-site and on-site interpretation would be considered, including site stabilization or reconstruction for interpretive enhancement, exhibits, and signing and brochures.

Fort Stanton would be designated a Special Recreation Management Area with emphasis on providing quality recreational opportunities in concert with other resource programs.

In addition to the 40 miles of multi-use trails already in use, about 60 miles of existing roads or trails and about 15 miles of new trails would be developed and maintained as multi-use trails for hiking, horseback riding and mountain bikes. These trails, comprising about 56 acres, would be closed to the use of OHVs.

Camping at Fort Stanton would be managed by:

- Limiting vehicle camping (driving motorized vehicles to a campsite) to the Rio Bonito and Fort Stanton Cave campgrounds and any other designated campsites. But, in no case would camping be allowed within 100 feet of the Rio Bonito and Salado Creek. About 250 acres would be closed to the use of OHVs in these areas.

- Permitting back country camping throughout Fort Stanton, except within 100 feet of the Rio Bonito and Salado Creek and no closer than 300 feet from wildlife and livestock waters, seeps or springs.

- Limiting all camping to no closer than one-quarter mile from waysides, overlooks, interpretive trails or state highways, except at developed campgrounds and designated campsites.

- Establishing a walk-in primitive campground of 2 to 3 acres along Rio Bonito Creek.
- Considering development of a 20-acre full-service campground near U.S. Highway 380 that would accommodate modern recreational vehicles, if proposed development of Tract 5 of the Rio Bonito land exchange is determined not to be feasible.

Approximately 24,300 acres would be designated as limited to designated roads and trails for OHV use, to protect soils, cultural resources, and vegetation, including threatened or endangered species.

A wayside stop would be considered for development along U.S. Highway 380 to interpret the historical, archaeological, and recreational opportunities of the area.

Passages in Fort Stanton Cave would not be proposed for designation as a National Scenic Trail.

Roswell Cave Complex ACEC

The Roswell Cave Complex ACEC consists of nine cave systems. The nine cave systems comprising the Roswell Cave Complex are: Angora-Corn Cave; Bat Hole Cave; Coachwhip Cave; Crockett Cave; Crystal Caverns-Devils Well Caves; Martin-Antelope Gyp Cave; Millrace Cave; Torgac Cave; and Zia Christine Cave. The ACEC comprises 16,818 surface acres. There are 14, 894 acres of federal mineral estate in the ACEC, including 3,000 acres under private surface. The surface acreage consists of the following categories and acreages:

Public land, 11,894 acres
Private land, 4,920 acres

Refer to Table 41 for the categories and acreages of lands comprising the ACEC, listed by cave system.

Management Goal:

Protect the natural and scenic values, while allowing for recreational, commercial, scientific and educational use.

Management Prescriptions:

The management prescriptions for Alternative C are the same as those for Alternative B, with the following exceptions.

The federal mineral estate in the ACEC would be open to the leasing of oil and gas with "no surface occupancy."

All lands in the ACEC would be designated avoidance areas for major rights-of-way.

Wildfire suppression in the ACEC would include the protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of heavy equipment to construct fire line within 200 meters of known cave entrances, passages or aspects of caves, or significant karst features, or within the exclosures around caves.

ALTERNATIVE D

Alternative D is more balanced than the other alternatives. It attempts to support the use and development of public land resources and values while maintaining or improving important environmental values.

In this alternative, management proposed for the Carlsbad Resource Area is found only in the Fluid Minerals section under the Minerals Management heading and in appendixes referenced in that section. All other proposed management in this alternative is for the Roswell Resource Area. The term "resource area" applies to the Roswell Resource Area.

The Surface Use and Occupancy Requirements (Appendix 3) would be applied, when applicable, to all actions described in this alternative.

MINERALS MANAGEMENT

Fluid Minerals

Goal: Provide for the leasing, exploration and development of oil and gas resources within the Roswell District. Some existing stipulations may be rescinded, and would be replaced by standard terms and conditions or less restrictive stipulations.

ROSWELL DISTRICT

The BLM administers approximately 13,835,000 acres of federal oil and gas mineral estate in the Roswell District. Under this alternative:

Approximately 13,220,706 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development under the BLM's standard terms and conditions, the Surface Use and Occupancy Requirements for this alternative (Appendix 3), the Roswell District Conditions of Approval (Appendix 4), and the Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas for this alternative (Appendix 5). The discrete components of these requirements would be applied on a case-by-case basis when needed to mitigate impacts or guide use. The Surface Use and Occupancy Requirements would be applied to new leases or as conditions of approval for proposed activities on existing leases, following NEPA analysis. The Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas would be applied as conditions of approval.

As a result of these requirements, some existing leasing stipulations would be rescinded or would be replaced by revised stipulations, in both the Carlsbad and Roswell resource areas. The proposed changes are summarized in Table 21.

Approximately 120,279 acres (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued.

Approximately 494,015 acres (4 percent) would be closed to leasing. In these areas, existing leases would continue to be developed on a case-by-case basis. However, once leases terminate, they would not be re-offered for leasing.

Produced water disposal pits on public lands would not be allowed west of the Pecos River, within 100-year floodplains or within 200 meters of drainages, playas, water wells, or springs throughout the district. In all other areas of the Roswell District, disposal of produced water in lined pits may be permitted on public lands.

Revegetation of disturbed areas would be required. Reclamation techniques, such as deeper rips, different seed mixtures, mulching, and the applications of fertilizer, would be used to accelerate the reclamation of pits, roads and pads to provide for maximum ground and surface water protection. The removal of caliche from roads and pads could be required to enhance reclamation efforts. Waiver of this requirement would be considered if diligent attempts to revegetate a site have failed and the Authorized Officer determines that further attempts would be futile.

CARLSBAD RESOURCE AREA

The BLM administers approximately 4,095,000 acres of federal oil and gas mineral estate in the Carlsbad Resource Area. Under this alternative:

Approximately 3,909,576 acres (95 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District." The total acreage includes controlled surface use restrictions and approximately 460,700 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. See Tables 8 and 56, and Map 16.

Approximately 82,667 acres (2 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 8 and 57, and Map 16. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

TABLE 56
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
CARLSBAD RESOURCE AREA
ALTERNATIVE D

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
City of Carlsbad Water Well Field	29,520		
East Guadalupe Water Well Field Habitat Management Area		25,600	
Subtotal	29,520	25,600	
OTHER AGENCY MANAGEMENT:			
Air Base City, Hobbs Industrial Air Park	160		
Carlsbad Airport	160		
Jal Airport	280		
Artesia Airport	200		
Lincoln National Forest	N/A[2]		
Subtotal	800		
Total	30,320	25,600	

[1] Includes areas described in "Management Common to All Alternatives."

[2] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 57
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
CARLSBAD RESOURCE AREA
ALTERNATIVE D

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Black River Buckwheat Population Area	720		
Chosa Draw ACEC	2,820		
CP Hill Buckwheat Population Area	360		
Guadalupe Escarpment Scenic Area (zone 1)	11,700		
Laguna Plata Archaeological District	3,360		
Living Desert State Park	1,520		
Maroon Cliffs Archaeological District	6,840		
Pecos River Canyons Complex ACEC/RNA[2]	4,505		
Poco Site	265		
Pope's Well	80		
Seven Rivers Hills HMA	540		
South Texas Hill Canyon RNA		3,600	
Yeso Hills RNA	557		
Subtotal	33,267	3,600	
OTHER AGENCY MANAGEMENT:			
Avalon Reservoir	14,800		
Brantley Lake State Park	10,000		
Brantley Reservoir	21,000		
Lincoln National Forest	N/A[3]		
Subtotal	45,800		
Total	79,067	3,600	

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-1 in Appendix 3 for estimated of additional acreage that could be affected by the Requirements.

[1] Includes area described in "Management Common to All Alternatives."

[2] Acreage increased by 40 acres over Alternative A, to accommodate T&E species habitat.

[3] Amount of affected acreage not known.

Source: BLM files, 1994.

Approximately 105,577 acres (3 percent) would be closed to leasing to protect special resources or to support other public uses. See Tables 8 and 58, and Map 16. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

In the Carlsbad RMP, a number of areas were designated as special management areas. A variety of management practices were prescribed, including oil and gas stipulations. The use of the Surface Use and Occupancy Requirements, and reliance on off-road vehicle designations and visual resource management prescriptions established in the Carlsbad RMP make the continued use of oil and gas leasing stipulations unnecessary on the following areas:

Blue Spring
Bogle Flat Spring
Little McKittrick Draw HMA
Owl Spring
Preservation Spring
Southern Gypsum Soil Area
Lesser prairie chicken habitat areas
Heron rookeries
Ben Slaughter Draw
Bluntnose Shiner HMA
Cottonwood Spring
Fence Canyon Caves
Honest Injun Cave
KFF Caverns
Lost Cave
Pecos River Corridor
Yellow Jacket/Lair Caves

Existing oil and gas leasing stipulations for these areas would no longer be used under this alternative. The proposed changes are summarized in Table 21. Other management prescribed in the Carlsbad RMP for these areas would not change, and these areas would still be managed as special management areas. If needed, standardized lease notices would be used to provide information about OHV and VRM requirements to purchasers of leases.

The Maroon Cliffs Archeological District was established in the Carlsbad RMP. Under this alternative, the size of the area would increase from 11,783 acres to 17,720 acres to include important areas of cultural resources. Management of oil and gas activity would be changed from no surface occupancy on 1,880 acres under Alternative A to no surface occupancy on 6,840 acres and no leasing on 10,880 acres. Other management prescriptions identified in the Carlsbad RMP would remain unchanged and would apply to the entire acreage of the archeological district. Refer to Tables 57 and 58, and Map 24.

ROSWELL RESOURCE AREA

The BLM administers approximately 9,740,000 acres of federal oil and gas mineral estate in the Roswell Resource Area. Under this alternative:

Approximately 9,313,950 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District". This total includes controlled surface use restrictions and approximately 241,338 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. See Tables 13 and 59, and Map 11.

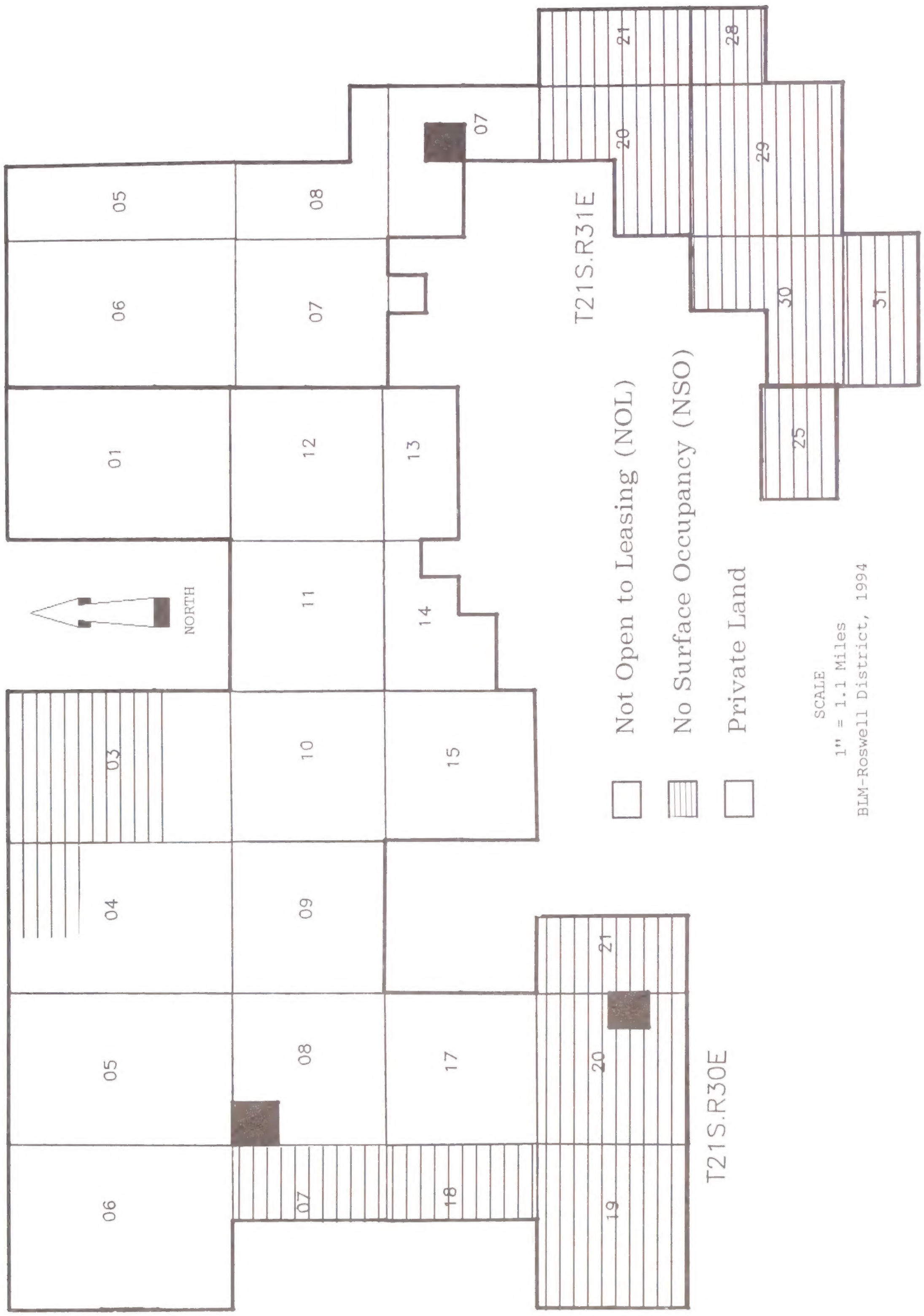
Approximately 37,612 (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 13 and 60, and Map 11. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 388,438 acres (4 percent) would be closed to leasing to protect resources or to support other public uses. See Tables 13 and 61, and Map 11. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

Locatable Minerals

Goal: Continue to keep lands available to locatable minerals while maintaining important environmental values.

The areas summarized in Table 62 and shown on Map 9 would be proposed for withdrawal from entry or appropriation under the public land laws, including the general mining laws.



MAP 24
MAROON CLIFFS
ARCHAEOLOGICAL DISTRICT
ALTERNATIVES D and E
Carlsbad Resource Area

TABLE 58
AREAS CLOSED TO FUTURE LEASING
CARLSBAD RESOURCE AREA -- ALTERNATIVE D

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Cave Protection Zones (Dark Canyon)	10,120		
Devils Den WSA	320		
Little Walt Canyon Quarry Site	40		
Lonesome Ridge WSA[2]	3,505		
Maroon Cliffs Archaeological District	10,880		
McKittrick Canyon WSA	200		
McKittrick Hill Caves	5,240		
Mudgetts WSA[3]	1,060		
Subtotal	31,365		
OTHER AGENCY MANAGEMENT:			
Carlsbad Caverns National Park/Wilderness	46,530		
Gnome Site	680		
Lincoln National Forest	26,282		
State Militia Site	720		
Subtotal	74,212		
Total	105,577		

[1] Includes areas described in "Management Common to all Alternatives."

[2] The 2,990-acre Lonesome Ridge ACEC is within the Lonesome Ridge WSA. The ACEC would remain closed to leasing even if the WSA is not designated as wilderness.

[3] Acreage shown is that part of the WSA outside the cave protection zones, which would become available for future leasing if the WSA is not designated as wilderness.

Source: BLM files, 1994.

TABLE 59
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
ROSWELL RESOURCE AREA -- ALTERNATIVE D

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
OTHER AGENCY MANAGEMENT:			
Santa Rosa Municipal Airport	320		
Melrose Bombing Range, buffer area	1,000		
Total	1,320		

[1] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

TABLE 60
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
ROSWELL RESOURCE AREA
ALTERNATIVE D

Area[1/]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Border Hill NNL		150	
Cocklebur Lakes Archaeological District	3,000		
Garnsey Bison Kill Site	520		
Haystack Butte Archaeological District	4,067		
Haystack Mountain OHV Area	4,153		
Mescalero Sands ACEC	7,931		
Mescalero Sands North Dune OHV Area	1,336		
North Pecos River ACEC	2,120		
Overflow Wetlands ACEC	2,300		
Valley of Fires Recreation Area		463	
Subtotal	25,427	613	
OTHER AGENCY MANAGEMENT:			
Cibola National Forest			N/A[2]
Fort Sumner Project and Sumner Lake State Park	11,240		
Lincoln National Forest			N/A[2]
Tucumcari Project	7		
Ute Lake State Park	325		
Subtotal	11,572		
Total	36,999	613	

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-2 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1/] Includes areas described in "Management Common to All Alternatives."

[2/] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 61
AREAS CLOSED TO FUTURE LEASING
ROSWELL RESOURCE AREA
ALTERNATIVE D

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Alleged UFO Crash Sites[2]	1,120		2,560
Carrizozo Lava Flow and Little Black Peak WSAs		25,312	
Fort Stanton ACEC			27,622
Mathers Research Natural Area	242		
North Pecos River ACEC	2,080		
Overflow Wetlands ACEC	700		
Roswell Cave Complex ACEC	12,654	1,600	640
Subtotal	16,796	26,912	30,822
OTHER AGENCY MANAGEMENT:			
Bitter Lake National Wildlife Refuge	6,320		
Bottomless Lakes State Park	460		
Cibola National Forest			19,178
Grulla National Wildlife Refuge	69		
Lincoln National Forest			99,171
Melrose Bombing Range, core area	6,714		
Salt Creek Wilderness	1,240		
White Sands Missile Range		180,756	
Subtotal	14,803	180,756	118,349
Total	31,599	207,668	149,171

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[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

Source: BLM files, 1994.

TABLE 62
AREAS WITHDRAWN FROM MINERAL ENTRY ROSWELL RESOURCE AREA ALTERNATIVE D

Area[1]	Estimated Mineral Acres
BLM MANAGEMENT:	
Alleged UFO Crash Sites[2]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area (staging area)	160
Mathers Research Natural Area	242
Mescalero Sands ACEC[3]	7,931
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	3,000
Roswell Cave Complex ACEC[4]	14,894
Spring and Seep Areas	760
Valley of Fires Recreation Area	463
Subtotal	95,774
OTHER AGENCY MANAGEMENT:	
Blackwater Archaeological Site	711
Canal Right-of-Way (NM 21834)	7
Melrose Bombing Range, core area	6,714
Nike Hercules Defense Site	325
NM Army National Guard Training Site	53
Fort Sumner Dam and Sumner Lake State Park	8,123
Tucumcari Project, Conchas Canal (NM 52398)	7
Two Rivers Reservoir Project	2,590
Subtotal	18,530
Total	114,304

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[1] Includes areas described under "Management Common to All Alternatives."

[2] Two alleged sites.

[3] May include as many as 6,617 acres originally in the Mescalero Sands Recreation Complex.

[4] Includes original 40-acre withdrawal on Torgac Cave.

Source: BLM files, 1994.

Solid Leasable Minerals

Goal: Keep lands available for leasing and production, while maintaining important environmental values.

Lands in the following area would remain closed to leasing:

- Mathers Research Natural Area, 242 acres

Additional public lands that would be closed to solid mineral leasing are summarized in Table 63 and are shown on Map 19.

Saleable Minerals

Goal: Provide mineral materials to the public while maintaining the protection necessary to prevent adverse environmental impacts and to minimize impacts to public health and safety.

Existing pit locations would not be closed until material is depleted unless it has been determined that the pit is causing undue and unnecessary environmental degradation. Pits closed would be reclaimed to standards that would conform to, or improve, the condition of the surrounding ecosystem.

All federal mineral estate in Fort Stanton would be closed to mineral material disposal with the following exceptions: a 5-acre tract located in the NE¼SE¼, sec. 9, T. 10 S., R. 14 E., to be used as a community pit; and any location within the 1666-acre Sierra Blanca Airport to support the airport's needs.

The areas that would be closed to mineral material disposals to preclude surface disturbance are summarized in Table 64 and are shown on Map 20.

LANDS AND REALTY MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Utility and Transportation System

Areas proposed for exclusion of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 65 and are shown on Map 12. Lands acquired as habitat for Special Status Species or acquired for wetland/riparian values would be added to the right-of-way exclusion area for major projects. Exceptions for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in exclusion zones on a case-by-case basis.

Areas proposed for avoidance of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 66 and are shown on Map 21. Rights-of-way for major projects and for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in avoidance zones on a case-by-case basis.

No additional rights-of-way corridors would be designated.

See management common to all alternatives for a description of the existing corridor.

Acquisition

Over the life of the plan, the acquisition of an estimated 95,600 acres of non-federal lands or interests in non-federal lands would be considered on a case-by-case basis to achieve management objectives. The lands summarized in Table 67 and described in Appendix 9 are currently identified as being suitable for consideration for acquisition as opportunities become available. Any lands acquired would be managed according to the management prescriptions in this alternative.

Easements would be acquired to provide access to public lands for recreation, wildlife, range, cultural/historical, mineral, ACEC, special management area and other resource needs, as

TABLE 63
AREAS CLOSED TO SOLID MINERAL LEASING
ROSWELL RESOURCE AREA - ALTERNATIVE D

Areas[1]	Estimated Mineral Acres
Alleged UFO Crash Sites[2]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	6,872
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,931
Mescalero Sands North Dune OHV Area	1,705
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	3,000
Roswell Cave Complex ACEC	14,894
Valley of Fires Recreation Area	463
Total	103,431

[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

Source: BLM files, 1994.

TABLE 64
AREAS CLOSED TO THE DISPOSAL OF MINERAL MATERIALS
ROSWELL RESOURCE AREA - ALTERNATIVE D

Areas	Estimated Mineral Acres
Alleged UFO Crash Sites[1]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Feather Cave Archaeological Complex	330
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	3,500
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,931
Mescalero Sands North Dune OHV Area	1,136
North Pecos River ACEC	1,760
Overflow Wetlands ACEC	3,000
Roswell Cave Complex ACEC	14,894
Valley of Fires Recreation Area	463
Total	69,758

[1] Two alleged sites.

Source: BLM files, 1994.

TABLE 65
RIGHTS-OF-WAY EXCLUSION AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE D

Areas	Estimated Acres
Alleged UFO Crash Sites[1]	3,680
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	24,630
Haystack Butte Archaeological District	3,400
Mescalero Sands ACEC	7,888
Mathers Research Natural Area	242
North Pecos River ACEC	3,360
Overflow Wetlands ACEC	3,000
Rio Bonito[2]	3,000
Roswell Cave Complex ACEC	14,894
U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)	76
Valley of Fires Recreation Area	463
Total	93,095

[1] Two alleged locations.

[2] Includes the Rio Bonito acquired lands, Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

TABLE 66
RIGHTS-OF-WAY AVOIDANCE AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE D

Areas	Estimated Acres
Core Prairie Chicken Habitat Areas	245,000
Mescalero Sands North Dune OHV Area (applies to overhead power and telephone lines)	1,136
Garnsey Bison Kill Site	360
Haystack Mountain OHV Area (applies to overhead power and telephone lines)	4,153
Total	250,649

Source: BLM files, 1994.

TABLE 67
LANDS CONSIDERED SUITABLE FOR POTENTIAL ACQUISITION
ROSWELL RESOURCE AREA
ALTERNATIVE D

Areas	Private	State
Caprock WHA Expansion	8,480	18,969
Carrizozo Lava Flow and Little Black Peak WSAs	5,512	4,321
Cedar Hills & Pecos River Deer Management Areas		3,521
Fort Stanton Area		1,320
Garnsey Bison Kill Site	200	320
Haystack Butte Archaeological District	40	640
Haystack Mountain OHV Area	1,200	1,453
Mescalero Sands ACEC	320	1,800
Mescalero Sands North Dune OHV Area	410	
North Pecos River ACEC	1,880	1,160
Overflow Wetland ACEC	2,100	1,700
Playa Lakes	1,051	590
Rio Bonito[1/]	1,018	1,982
Roswell Cave Complex ACEC		4,920
Valley of Fires Recreation Area	493	19
Total	22,704	42,715

[1/] Includes Rio Bonito Waterfall and lands along the Rio Bonito adjacent to Fort Stanton ACEC.

Source: BLM files, 1994.

opportunities arise. Criteria for the acquisition of easements are described in Appendix 8. Easements are needed in the following areas:

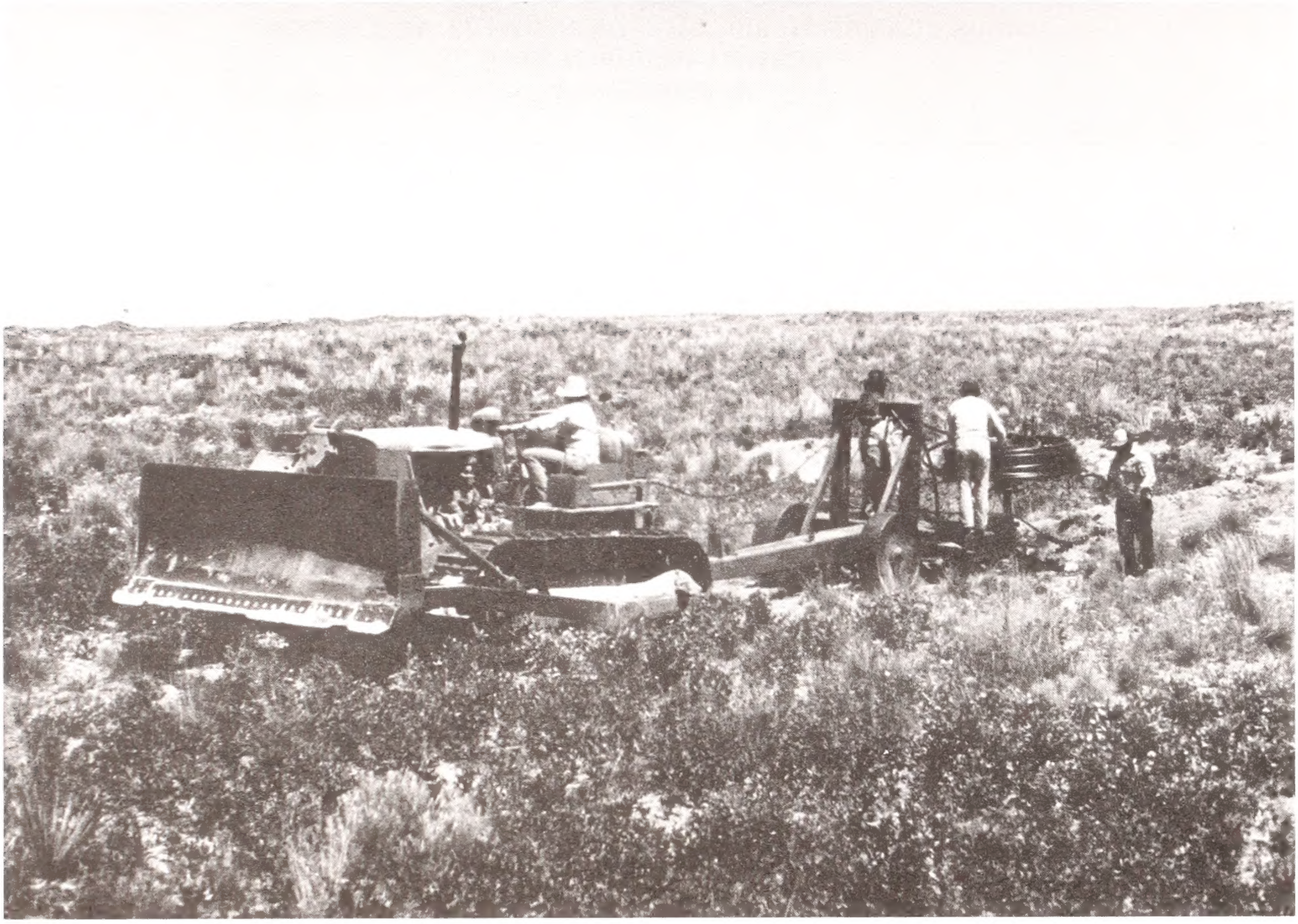
- Overflow Wetlands WHA
- Crockett Cave
- Crystal Cave
- Millrace Cave
- Little Black Peak Cinder Cone east access
- Little Black Peak Cinder Cone west access
- Carrizozo Lava Flow WSA lower windmill east access
- Mescalero Sands ACEC east access
- Mescalero Sands ACEC west access

LIVESTOCK GRAZING MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Rangeland improvements and vegetation treatments would continue to be implemented to improve or maintain forage production and range condition, in an effort to achieve the Desired Plant Community. Watershed and wildlife habitat management and livestock production needs would be considered equally.

The stocking rate of sheep in the Macho WHA in areas currently supporting antelope, and which meet transplant criteria, must not exceed an average of 60 sheep per section per allotment over the course of the grazing year.



Water pipeline construction will benefit livestock and wildlife.

VEGETATION MANAGEMENT

Goal: Manage resources to maintain or improve vegetation with the emphasis on watershed protection and forage for livestock and wildlife.

Alternative D would be the same as Alternative B, with the exceptions of practices and constraints proposed for use in meeting the management objectives and DPC. These exceptions are listed below. Constraints specific to one community are listed with that community. Management proposed for the Mixed Shrub Malpais and Riparian communities, and the Rio Bonito Acquired Lands is the same as Alternative B and is not repeated here.

The development of projects as a means of meeting a DPC would be based on the thresholds and vegetation condition objectives described in Alternative B. The standard practices that could be employed to meet a DPC would be based on thresholds and vegetation condition objectives described below for each community type. The specific practices to be used and the numbers of acres affected would be determined during activity planning, based on the results of resource monitoring. During activity planning, specific resource condition objectives would be developed for a distinct area (e.g., an allotment) based on the planned use of the area and the more general vegetation condition objectives developed in this land use plan.

The standard practices that would be employed to meet management objectives for each community are:

- Utilization levels not exceeding 45 percent of annual plant production. Utilization levels would be determined prior to green-up, and measured on key forage species.

- Projects such as fences, water developments, erosion control structures, reseedings, or vegetative sales.

- Grazing treatments such as changes in season of use, change of class of livestock, or changes in stocking rates.

- Vegetation treatments, including prescribed fire or prescribed natural fire; fuelwood sales; and biological or mechanical controls. Chemical control would be used on salt cedar, but only if the chemicals are applied using ground application methods.

Constraints on treatments for each community are:

- A project area would not be chemically treated until the chemical treatment of an adjacent project area has been in place at least five years.

- Re-treatment of a project area with chemicals would not be conducted within 15 years following treatment. The need for re-treatment would be determined by vegetation condition objectives and treatment threshold levels.

Grassland Community

Constraints on treatments in the grassland community are:

- The requirement that vegetation composition in any given pasture include at least 10 genera of fall forbs preferred by pronghorn antelope does not apply to this alternative (see Table 34).

Shinnery Oak-Dune Community

Refer to the standard practices and constraints listed above.

Pinon-Juniper Grassland Community

Constraints on treatments in the pinon-juniper community are:

- Removal of trees would be done to create edge and mosaic patterns.

Mixed Desert Shrub Community

Refer to the standard practices and constraints listed above.

Drainages, Draws and Canyons Community

Constraints on treatments in the drainages, draws and canyons community are:

- Browse species would be protected.

- Riparian-wetland vegetation would be protected by methods such as developing riparian pastures, establishing upland waters, and conducting salt cedar control.

CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT

This Alternative is the same as Alternative B, with the following exceptions.

Goal: Protect all eligible and all potentially eligible sites with adequate buffers and pursue gaining knowledge from cultural properties with data recovery.

Approximately 10 percent of the recorded archeological sites in the resource area would be managed for conservation. The management objective for conservation would be to preserve existing archeological values. This would be achieved by protecting sites from damage by natural processes such as erosion and from man-caused damage such as pot hunting and surface disturbing activities. The Paleoindian sites, such as those in the Haystack Butte area would fall into this category.

Approximately five percent of the recorded archeological sites in the resource area would be managed to emphasize public values and interpretation. The management objective for public values and interpretation would be to develop archeological properties for public use. This would be achieved by scientifically treating a site, such as by excavation and developing exhibits so that the cultural property is interpreted for public recreation and education. The Garnsey Bison Kill site near Bottomless Lakes and the Feather Cave Archeological Complex at Fort Stanton are two sites that would lend themselves to interpretation.

Approximately 85 percent of the recorded archeological sites would be managed for information use. Management would emphasize the use of cultural properties for the purpose of gaining knowledge. This would be achieved by scientifically studying the property in whatever ways are appropriate in order to extract as much information as possible. Two sites which are currently being studied are the Upper Bonito I and Lower Stanton Ruin.

With regard to the proposed 3,400-acre Haystack Butte National Register Archeological District, the following management would be applied. (See Tables 60, 62, 63, 64, 65, 68.)

- oil and gas: open to leasing with "no surface occupancy"
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: exclusion area for major rights-of-way
- OHV designations: OHV use limited to designated roads and trails

With regard to the proposed 3,000 acre Cocklebur Lakes National Register Archeological District, the following management would be applied. (See Tables 60, 62, 63, 64, 65, 68.)

- oil and gas: open to leasing with "no surface occupancy"
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: exclusion area for major rights-of-way
- OHV designations: OHV use limited to designated roads and trails

With regard to the 360-acre Garnsey Bison Kill Site, management would include development of an interpretive site. One management goal would be to allow the public to see an archeological-paleontological site exposed in the sides of the arroyo running through the site. Some of the site would be stabilized, protecting the archeological and paleontological values. Another goal would be to generate appreciation of archeology and paleontology by developing a trail with interpretive signs and markers, and other on-site and off-site interpretive techniques. Other development of the site could include site stabilization, exhibits, and a parking area. The following management actions would be employed in management of the site:

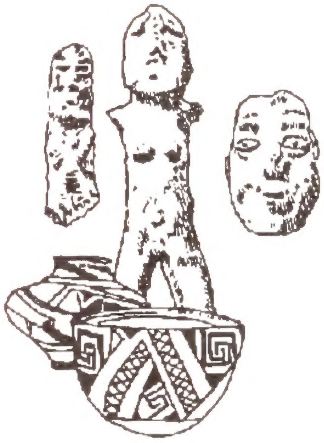


TABLE 68
OFF-HIGHWAY VEHICLE MANAGEMENT DESIGNATIONS
ROSWELL RESOURCE AREA
ALTERNATIVE D

Designation	Areas[1]	Acres
Closed	Alleged UFO Crash Sites[2]	3,680
	Border Hill NNL	150
	Carrizozo Lava Flow and Little Black Peak WSAs	25,312
	Comanche Hill "A" Area	660
	Comanche Hill "C" Area	240
	Feather Cave Archaeological Complex	300
	Fort Stanton ACEC: Rio Bonito, and Salado Creek Area	250
	Fort Stanton ACEC: Trails (105 miles)	51
	Garnsey Bison Kill Site	360
	Mathers RNA	242
	Overflow Wetlands ACEC	700
	Playa and Alkali Lakes	7,400
	Roswell Cave Complex ACEC[3]	500
	Springs and Seeps	760
Total Closed		40,605
Limited Designated Roads/Trails	Billy the Kid Recreation Site	80
	Cocklebur Lakes Archaeological District	3,000
	Dunahoo Hills (ATVs less than 50 inches)	640
	Fort Stanton ACEC	23,999
	Garnsey Bison Kill Site	240
	Haystack Mountain OHV Area (ATVs less than 50 inches)	6,816
	Haystack Butte Archaeological District	3,400
	Mescalero Sands ACEC	7,888
	North Pecos River ACEC	3,360
	Overflow Wetlands ACEC	2,300
	Pecos River Floodplain	19,200
	Remainder of Resource Area	1,363,969
	Rio Bonito Acquired Lands	1,100
	Roswell Cave Complex ACEC	11,394
	Valley of Fires Recreation Area	463
Total Limited		1,447,849
Open	Mescalero Sands North Dune OHV Area	1,546
Total Open		1,546

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[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

[3] Includes an additional 480 acres that fall within Wilderness Study Area OHV closures that are not reflected in cave ACEC closures summary.

Source: BLM files, 1994.

- oil and gas: open to leasing with "no surface occupancy" on 360 acres
- locatable minerals: withdraw from entry
- solid leasable minerals: close to leasing
- saleable minerals: close to disposal
- rights-of-way: exclusion area for major rights-of-way
- livestock grazing: 120 acres closed

OUTDOOR RECREATION MANAGEMENT

Recreation Management

Goal: Manage recreation resources to emphasize semi-primitive non-motorized, roaded natural and rural recreation opportunities, while providing environmental protection of ecosystems.

The Mescalero Sands ACEC, Fort Stanton ACEC, Overflow Wetlands ACEC, Roswell Cave Complex ACEC, Mescalero Sands North Dunes OHV Area, Haystack Mountain OHV Area, Garnsey Bison Kill Site, Rio Bonito acquired lands, and Valley of Fires Recreation Area would be designated Special Recreation Management Areas (refer to Map 23). The public lands not designated Special Recreation Management Areas would be designated an Extensive Recreation Management Area (ERMA).

At the Valley of Fires Recreation Area, approximately four miles of hiking trails would be developed to provide access from the campground through the lava flow to the Cooper Cabin. Other recreation facilities, trails and roads at the Valley of Fires Recreation Area would be developed and maintained in accordance with the established plan for the area. About 493 acres of private land and 19 acres of state land on the east side of the presently developed area would be considered for acquisition, to provide space for future expansion of the developed area.

Lands acquired along the Rio Bonito near Lincoln (Tracts 1-4) would be managed for low intensity recreational use. Recreation activities that would be emphasized are fishing, nature viewing and non-trail hiking. The development of two small day-use areas on Tracts 1 and 4 would be considered. Development at these sites would include dirt access roads and parking areas. If Tract 5 is acquired, future intensive development would be considered, including the possible development of a full-service campground of 25 to 50 sites. Livestock grazing would be excluded from the Tract 5 site.

The Billy the Kid Recreation Site (80 acres of BLM-administered land) would be managed and developed for day use, with emphasis on providing access to the Pecos River and fishing. Development could include trails, picnic sites, roads and interpretive displays. Livestock grazing would be excluded from the site.

The Garnsey Bison Kill Site would be managed as an outdoor archaeological and paleontological classroom with emphasis on cultural and natural resource protection. Development could include exhibits, sign, brochures, self-guided interpretive trails, interpretive stations, and a parking area. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

An 86-mile Back Country Byway would be developed from Roswell to Capitan along State Highway 246, the Pine Lodge Road. Additional byways would be identified and evaluated for future designation and development. Future designations would be considered for roads or trails having high scenic value, unique geologic formations, botanical or biological features, historical or archaeological features, water attractions or other features with high public value.

The area listed below and in Table 61 would be closed to the leasing of oil and gas.

- Mathers Research Natural Area

The areas listed below and in Table 60 would be open to the leasing of oil and gas with "no surface occupancy."

- Border Hill NNL
- Mescalero Sands North Dune OHV Area

- Haystack Mountain OHV Area
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 62 would be proposed for withdrawal from entry or appropriation under the public land laws, including the general mining laws.

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Haystack Mountain OHV Area (staging area)
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 63 would be closed to the leasing of solid minerals.

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sand North Dune OHV Area
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 64 would be closed to the disposal of mineral materials (saleable minerals).

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sand North Dune OHV Area
- Mathers Research Natural Area
- Billy the Kid Recreation Site
- Valley of Fires Recreation Area

The areas listed below and in Table 65 would be excluded from major rights-of-way.

- Carrizozo Lava Flow and Little Black Peak WSAs
- Border Hill NNL
- Valley of Fires Recreation Area
- U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)
- Mathers Research Natural Area
- Rio Bonito acquired lands

The areas listed below and in Table 66 would be avoided when locating major rights-of-way.

- Mescalero Sands North Dune OHV Area (applies to overhead power and telephone lines)
- Haystack Mountain OHV Area (applies to overhead power and telephone lines)

Cave and Karst Resource Management

Goal: Protect cave values while allowing for recreational, commercial, educational, research and scientific uses.

Visitor use limits, seasons of use, and a permit system would be established for all significant caves where the entrance is on public land.

No surface occupancy would be allowed within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Refer to Appendix 3 for more information on this restriction.

Off-Highway Vehicle (OHV) Management

Goal: Reduce incompatible off-highway vehicle use. Upgrade existing, designated OHV areas to provide a safe and enjoyable experience for OHV users.

Inventories, public review, and transportation planning would be conducted to support road-by-road designations for roads and trails suitable for off-highway vehicle use.

Proposed designations are listed in Table 68 and shown on Map 14. All roads and trails not otherwise categorized would be designated limited to designated roads and trails for OHV use. Pending completion of formal designations, all roads and trails would be managed as limited to existing roads and trails for OHV use.

The Mathers RNA (242 acres) would be closed to OHV use, except for two existing roads, which would be classified as limited to designated roads or trails.

Public lands within the present boundaries of the Carrizozo Lava Flow and Little Black Peak WSAs (25,312 acres) would be designated closed to OHV use to protect outstanding primitive and semi-primitive values. Any state or private lands acquired within the present boundaries of the WSA's would be designated closed to OHV use. Public land and acquired state or private lands adjacent to the WSAs would be designated limited to designated roads and trails for OHV use to provide access and limit impacts to fragile soils and vegetation.

The Mescalero Sands North Dune OHV Area would be enlarged to approximately 1,546 acres, and would be designated open and managed for intensive OHV use, with emphasis on providing a quality play area for OHV's. Approximately 410 acres of private land would be considered for acquisition. Planned upgrades and development would include interpretive/safety displays with emphasis on the National Tread Lightly Program, sun shelters, rest rooms and potable water. Livestock would be fenced-out from about 20 acres around existing and planned developments.

The Haystack Mountain OHV Area would be enlarged to approximately 6,826 acres, and would be managed as a OHV Intensive Use Area and designated limited to designated roads for all-terrain vehicles less than 50 inches in width. Approximately 1,453 acres of state lands and 1,200 of private land would be considered for acquisition. Non-motorized use of Haystack Mountain OHV Area would be allowed. Facilities would be considered for development, such as rest rooms, sun shelters, trails, interpretive displays and picnic sites.

Approximately 463 acres in the Valley of Fires Recreation Area would be designated as limited to designated roads and trails for OHV use.

The Rio Bonito acquired lands (Tracts 1-5) would be designated limited to designated roads and trails for OHV use to protect riparian values.

The 150-acre Border Hills National Natural Landmark would be designated closed to off-highway vehicle use.

Approximately 120 acres of the 360 federal acres at the Garnsey Bison Kill site (the core area) would be designated closed to OHV use to protect the archaeological and paleontological sites. The remaining 240 federal acres and any acquired lands would be designated limited to designated roads and trails to protect the watershed above the bison kill site. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

Approximately 3,000 acres in the proposed Cocklebur Lakes National Register Archeological District and about 3,400 acres in the proposed Haystack Butte National Register Archeological District would be designated limited to designated roads and trails for OHV use.

Following inventory, if it is deemed necessary to protect a significant cave from OHV impacts, a cave exclosure would be constructed and the area within the enclosure would be designated closed to off-highway vehicle use.

A 640-acre OHV area in the Dunahoo Hills northeast of Roswell would be established, if demand warrants, and be designated limited to all-terrain vehicle use.

The 80-acre Billy the Kid Recreation Site would be designated limited to designated roads and trails for OHV use, to protect recreational values.

Approximately 19,200 acres of public lands along both sides of the Pecos River would be designated as limited to designated roads and trails for OHVs to protect the floodplain, riparian zone and wetlands.

Approximately 7,400 acres encompassing 56 playas and alkali lakes, and the area within 200 meters of the playas and alkali lakes would be designated closed to off-highway vehicle use.

Approximately 1,420 acres encompassing the area within 200 meters of the source of about 20 springs or seeps, and within 200 meters on either side of downstream riparian areas created by flows from the source or resulting from riparian area management, would be designated closed to off-highway vehicle use.

Wilderness Management

The Little Black Peak and Carrizozo Lava Flow WSAs (25,312 acres) would be managed for roadless recreational opportunities.

If Congress does not designate the WSAs as wilderness, a recommendation would be made to Congress that the Little Black Peak and the Carrizozo Lava Flow areas (not necessarily the WSAs) be designated a National Conservation Area.

Trailhead parking areas adjacent to the WSAs and a limited, primitive trail system about two miles in length would be developed to the Little Black Peak cinder cone and to the Lower Windmill area in the southeast corner of Little Black Peak WSA. About three miles of trail from the Valley of Fires Campground to the Malpais Madness Cave would be developed, as well. In each case, legal access would be acquired prior to development of a trail system. Development of these trails would comply with the nonimpairment criteria of the "Interim Management Policy and Guidelines for Lands Under Wilderness Review" and the "Wilderness Management Policy."

Visual Resource Management

Painting would be required of all permanent surface facilities or equipment approved by the BLM in Class II Visual Resource Management zones. Painting of facilities or equipment also would be required in Class III VRM zones in the foreground view areas of paved roads, non-paved county roads, BLM back-country byways, and other areas determined by NEPA analysis to need painting to reduce visual impacts. Paint colors would be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. Refer to Appendix 3 for more discussion of this topic.

WATERSHED MANAGEMENT

This alternative is the same as Alternative B, with the following exceptions.

Soil Management

Best Management Practices (BMPs) would be used to minimize sedimentation as a cause of nonpoint source pollution in surface waters. The BMPs, based on standard operating procedures, oil and gas lease stipulations or BLM policy, would be specified in activity plans for actions that make soils more susceptible to erosion, or which impair soil productivity. Full consideration would be given to environmental benefits and economic costs of the BMPs. Activities requiring implementation of BMPs would include, but would not be limited to:

- soil disturbing activities that result in soil loss due to accelerated wind or water erosion;
- activities that reduce vegetative cover, thus exposing the soil to erosion processes, and reducing the amount of soil organic matter and soil productivity;
- activities that tend to concentrate surface runoff or steepen hydraulic gradients, thus increasing soil erosion by flowing water;
- activities that result in sediment loading directly to streams;
- activities that damage soil structure by compaction or other means; and
- activities that degrade the physical, chemical, or biological properties of the soil, such as high-intensity burns, contamination by toxic substances, or other means.

No occupancy or use would be allowed on slopes over 20 percent. Occupancy or use of fragile soils would be considered on a case-by-case basis. Refer to Appendix 3 for more discussion of this restriction.

Surface Water Management: Quantity

As part of the watershed management plans to be prepared for six watersheds, site-specific prescriptions would be written which could include, but not be limited to, the following practices: (1) mechanical or prescribed fire vegetation treatments, or chemical treatments applied by hand to salt cedar; (2) plantings of native riparian plant species and seeding of herbaceous ground cover; (3) livestock grazing management by controlling livestock numbers and season of use, and by providing alternative water and mineral sources; (4) construction of erosion, sediment and flood control structures; (5) use of other methods determined most suitable for site-specific conditions; (6) implementation of a monitoring program, including a feedback loop which would guide management based on monitoring information.

Surface Water Management: Quality

Further degradation of water quality would be prevented whenever practicable to meet present or possible future demands, such as domestic or municipal water supplies, irrigation, livestock, wildlife, recreation, aquatic and riparian habitat, and other uses. Exceptions would be considered on a case-by-case basis when water quality standards more stringent than state and federal standards would result in increased economic costs that exceed environmental benefits.

Groundwater Management

Goal: Maintain or improve groundwater quality to meet applicable state and federal standards.

Further degradation of groundwater quality would be prevented whenever practicable, even when Water Quality Control Commission standards allow for further degradation. Exceptions would be considered for areas specifically exempted by state or federal authority, and on a case-by-case basis when standards more stringent than state and federal standards would result in increased economic costs which exceed environmental benefits.

For any site proposed for pesticide treatment, the potential for groundwater contamination would be evaluated with the EPA rating system, DRASTIC (Aller et al. 1985). If the site proposed for treatment has a DRASTIC index greater than 100, it has a moderate to high potential for groundwater contamination, and would require a more detailed analysis prior to a decision being made on the proposed treatment. Factors that would be studied further include: pesticide solubility, mobility, speciation, degradation, and highly localized recharge areas.

WILDLIFE HABITAT MANAGEMENT

Special Status Species Habitat Management

Goal: Provide protection and recovery for all Special Status Species, which are federal and state listed species, and federal candidate species, and their habitats on public lands. Conserve occupied and potential habitat for these species on public land to maintain or enhance populations at levels to avoid listing by either state or federal governments while allowing for mineral production and development.

U.S. Fish and Wildlife Service Recovery Plans would be implemented, including the reintroduction of native special status species in suitable areas on public land in coordination and cooperation with local governments. Current plans cover the American peregrine falcon, bald eagle, Pecos gambusia, Kuenzler hedgehog cactus, Pecos bluntnose shiner and Black-footed ferret.

Big Game/Upland Game Habitat Management

Goal: Maintain or improve habitat utilized by big game or upland game to provide sufficient quantity and quality of habitat (food, water, cover, space), while allowing a level of mineral development and production that would not cause a decrease in the populations of these species.

Prescribed burns would be conducted in selected pinon-juniper community types at Fort Stanton and the Cedar Hills area west of Roswell. For each prescribed burn the acreage to be burned and the objective of the fire would be tied to wildlife habitat management and desired plant community management objectives described in activity plans. No surface occupancy would be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects. Refer to Appendix 3 for more discussion of this restriction.

Big game and upland game transplants or reintroductions on public lands would be conducted when cooperatively prescribed by the BLM and the NMDGF. Projected transplants or reintroductions include, but are not limited to:

- Pronghorn antelope in pastures that meet the suitability criteria (see Appendix 12);

- Mule deer in areas of low population density or in areas to enhance deer herd gene pools;

- Wild turkey at Fort Stanton and on the Rio Bonito acquired lands;

- Other big game or upland game species recommended by the New Mexico Department of Game and Fish.

If opportunities arise, acquisitions of non-federal lands would be considered in the following instances, to improve management of big game. Acquisitions in the Caprock deer management area would benefit special status species and raptor habitat management goals, as well.

- Caprock WHA: 18,969 acres of state land; 8,840 acres of private land

- Cedar Hills and Pecos River deer management areas: 3,521 acres of state land

- Rio Bonito area: 279 acres of state land

Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in lesser prairie chicken core habitat during the period of March 1 through May 31, each year. Additionally, no new drilling would be allowed in prairie chicken habitat within up to 200 meters of leks. Refer to Appendix 3 for more discussion of these restrictions.

Core prairie chicken habitat areas would be avoided when locating major rights-of-way. Refer to Table 66 and Map 21.

Waterfowl Habitat Management

Goal: Perpetuate a diversity and abundance of waterfowl populations in the Central Flyway by protecting and enhancing wetlands, including playa lakes, alkali lakes, sinkhole lakes and earthen tanks, while allowing a level of mineral development and production that would not decrease waterfowl habitat and populations.

Develop as many as 400 acres of wetland habitat in suitable areas within the floodplain of the Pecos River. Suitability criteria include but are not limited to:

- Areas with seasonal surface waters indicative of a high water table or subsurface clay layer;

- Areas with the potential of supporting cottonwood tree groves;

- Areas that have or would receive vegetation manipulation projects (salt cedar control, prescribed fire, riparian pasture development).

No surface occupancy would be allowed within up to 200 meters of active heronries. Refer to Appendix 3 for more discussion on this restriction.

Agricultural practices and moist soil management techniques would be used to enhance yearlong food supplies for wildlife on the lands acquired along the Rio Bonito. These practices may include but are not limited to:

- Share cropping of valuable foods (alfalfa, winter wheat, barley, pasture grasses) with a portion left as a standing crop for wildlife;

- Seasonal flood irrigation;

- Construction of irrigation ponds and wells;

- Construction of riparian pastures for livestock grazing management, if appropriate, that benefits riparian area management and wildlife habitat needs.

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan.

Raptor Habitat Management

Goal: Provide suitable raptor habitat conditions on public lands through the conservation and *management of essential habitat components, including habitat for prey species while allowing for mineral development and production that would not degrade habitat components.*

Nesting, migration, and wintering areas for raptors would be protected or enhanced on about 926,000 acres of public lands in the Macho, Caprock, Fort Stanton and Overflow Wetland wildlife habitat areas, and along the Pecos River.

Management emphasis for protection and enhancement of habitat would be focused on known key raptor areas and those identified in the future. Management practices could include developing protective exclosures around tree groves and sinkholes, and constructing raptor nesting platforms.

No surface occupancy would be allowed within up to 200 meters of active raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments. Refer to Appendix 3 for more discussion of this topic.

Fisheries and Aquatic Habitat Management

Goal: Protect and enhance aquatic habitat and associated natural diversity and distribution patterns of native nongame and sport fish, invertebrates, and aquatic mammals, while allowing for mineral development and production that would not degrade aquatic habitat.

Construction of streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection would be allowed for the Rio Bonito, Salado Creek and the Pecos River. Criteria for consideration include, but are not limited to, areas that:

- Exhibit streambank sloughing;
- Lack riparian vegetation or regeneration;
- Exhibit invasion of exotic or undesirable plant species;
- Exhibit erosion of side drainages;
- Lack riparian pastures to control livestock use.

Monitor lotic and lentic systems for:

- Compliance with established water quality standards;
- Fish and macroinvertebrate productivity and composition;
- Stream channel substrate condition as it relates to watershed condition;
- Use of water rights, where established.

Native fish and sport fish introductions or transplants would be undertaken in suitable waters located on public land, in coordination with the New Mexico Department of Game and Fish. Proposed introductions include but would not be limited to:

- Rainbow, cutthroat, brown, and brook trout in the Rio Bonito;
- Bass and bluegill in irrigation ponds.

Criteria for suitable waters include, but are not limited to:

- Availability, regime, and security of perennial water;
- No or low populations in stream segments with suitable habitat conditions (water flow, temperature, stream shading, pools & riffles, stable streambanks, water quality, substrate condition, invertebrates);
- Channel dimension and capacity.

Riparian/Wetland and Playa Lake Management

Goal: Restore and maintain riparian/wetland areas to achieve proper functioning condition. Allow for mineral development and production that would not degrade or impair the proper functioning condition of riparian habitat. Achieve an advanced ecological status, except where resource management objectives would require an earlier successional stage.

Lands within 200 meters of the source of springs and seeps listed in Appendix 3, and within 200 meters on either side of downstream riparian areas created by flows from the source, or through riparian area management, would be considered for withdrawal from entry or appropriation under the public land laws, including the general mining laws. Areas to be withdrawn would be prioritized according to the following criteria:

- Presence of threatened or endangered species;
- Potential habitat for threatened or endangered species;
- Limited alternative water sources in the area for wildlife and livestock;
- Federal ownership of both surface and subsurface estates;
- Presence of native riparian vegetation.

No surface occupancy would be allowed within up to 200 meters of playas and alkali lakes, perennial streams, rivers and floodplains and springs and seeps. Refer to the Surface Use and Occupancy Requirements in Appendix 3 for more discussion on these restrictions.

Springs and seeps, reservoirs, earthen tanks and playa lakes would be enhanced by constructing protective exclosures, planting native vegetation, establishing vegetation for wildlife cover, controlling undesirable vegetation, constructing supplemental water pipelines to specific sites, and providing off-site livestock water.

If opportunities arise, acquisition would be considered for 590 acres of state land and 1,051 acres of private land within or adjacent to playa lakes, and for 1,440 acres of state land and 2,955 acres of private land along the Pecos River. Any acquisitions in these areas would benefit riparian, wetland and playa lake management efforts.

FIRE MANAGEMENT

This alternative is the same as Alternative B, with the following exceptions:

Goal: Limit damage to natural resources and to life and property caused by wildfire. Wherever possible, restore fire to its natural role in the ecosystem through the use of prescribed fire. Use prescribed fire as a tool for land treatment to replace or augment the use of chemical and mechanical treatments.

Protection from Wildfire

Caves and karst areas: Fire suppression in cave and karst areas would include protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of heavy equipment to construct fire line within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features.

Steep slopes: Fire line would not be constructed with bulldozers or other heavy equipment on slopes greater than 20 percent, except to protect life or property.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The boundaries of the ACECs described below have been established based on the presence of resources and opportunities for efficient management, irrespective of land ownership. The inclusion of other ownerships in ACECs is for purposes of disclosure and does not mean those lands would be designated as part of an ACEC, or that the management proposed in this alternative would be applied to those lands. The acquisition of non-federal lands within ACECs is included in the management proposed in this alternative. If non-federal lands are acquired, those lands could then become part of a designated ACEC and be managed according to the management proposed in this alternative, without additional land use planning.

See Map 15 for the locations of the proposed ACECs. Refer to Appendix 13 for discussions of relevance and importance criteria for Areas of Environmental Concern. Refer to Appendix 14 for maps that display the differences among the alternatives.

Overflow Wetlands ACEC

The Overflow Wetlands ACEC comprises 6,814 surface acres and 3,000 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 2,987 acres
State land, 1,720 acres
Private land, 2,107 acres

Management Goal:

Protect the biological and scenic values of the Overflow Wetlands ACEC, which provides critical habitat for T/E fish species and supports a significant riparian/wetland plant community.

Management Prescriptions:

The management prescriptions for Alternative D are the same as those for Alternative B, with the following exceptions.

Salt cedar treatments would be conducted on public land in selected riparian-wetland areas using prescribed fire or mechanical control, or the application of chemicals, by hand.

Public grazing leases or permits affecting about 3,000 acres of public land currently in Allotments 65060, 65062, and 65069 would be adjusted to improve habitat for wintering waterfowl habitat. Adjustments may include changes in stocking rates and seasons of use, such as reducing year-long grazing to grazing between March 1 and mid-August. The grazing lease on Allotment 65041 would be cancelled.

North Pecos River ACEC

The North Pecos River ACEC comprises 6,400 surface acres and 4,200 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 3,360 acres
State land, 1,160 acres
Private land, 1,880 acres

Management Goal:

Protect the biological and scenic qualities of the Pecos River ACEC, which provides critical habitat for T/E fish species and supports a significant riparian plant community.

Management Prescriptions:

The management prescriptions for Alternative D are the same as those for Alternative B, with the following exceptions.

About 1,760 acres would be closed to the disposal of salable minerals. About 4,200 acres of federal minerals would be closed to the leasing of solid minerals and would be withdrawn from entry under the land laws (including the 1872 Mining Law). The intent of these actions is to eliminate surface disturbance along the Pecos River and in surrounding wildlife habitat.

Salt cedar control would be conducted on about 600 acres of public land in selected riparian-wetland areas, using prescribed fire or mechanical control, or the application of chemicals by hand.

The use of OHVs would be limited to designated roads and trails on about 3,360 acres.

Mescalero Sands ACEC

The Mescalero Sands ACEC comprises 10,007 surface acres and 7,931 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public Land, 7,888 acres
State Land, 1,799 acres
Private Land, 320 acres

Management Goal:

Protect the biological, archaeological and scenic qualities of the Mescalero Sands ACEC, with emphasis on preserving a portion of the shinnery oak-dune community to maintain the biodiversity of the ecosystem.

Management Prescriptions:

The management prescriptions for Alternative D are the same as those for Alternative B, with the following exceptions.

The federal mineral estate in the ACEC would be open to future oil and gas leasing with "no surface occupancy."

The present 1,838-acre grazing exclusion area would be enlarged by about 640 acres by realigning existing fences, to facilitate maintenance and to improve management of the area. On parts of the ACEC where livestock grazing would continue, no increase in grazing preference on public lands would be permitted. No additional range improvements or vegetation treatments geared toward livestock production would be permitted in the ACEC. Projects designed for resource enhancement or protection would be considered.

The entire ACEC would be designated limited to designated roads and trails for OHV use.

Fort Stanton ACEC

The Fort Stanton ACEC comprises 24,630 surface acres and 27,622 acres of federal mineral estate. The state-owned hospital and prison and the Sierra Blanca Airport within the boundary of the ACEC are not included in the acreage of the ACEC.

Management Goal:

Protect the biological, archaeological and scenic qualities of Fort Stanton.

Management Prescriptions:

The management prescriptions for Alternative D are the same as those for Alternative B, with the following exceptions.

All lands in Fort Stanton would be open to saleable mineral disposal, except for approximately 330 acres in the Feather Cave Archeological Complex. All public lands in Fort Stanton would remain withdrawn from the general mining laws, and closed to the disposal of leasable minerals and to the leasing of oil and gas.

Livestock grazing would be allowed consistent with recreation, wildlife, and riparian/watershed protection goals. Grazing would be limited or excluded in riparian pastures, highly erodible areas, cave entrances, campgrounds and day use areas, and sensitive archaeological sites. Livestock grazing would be excluded from the Feather Cave Archeological Complex. No grazing preference would be established.

Salt cedar treatments would be conducted on as many as 300 acres of selected riparian/wetland habitat along the Rio Bonito and Salado Creek using prescribed fire or mechanical control, or the application of chemicals, by hand.

Two overlooks would be considered for development on the north and south sides of the historical Fort to interpret the history of the Fort's structures and area, in conjunction with the Boots and Saddles initiative.

Approximately 330 acres around the Lower Stanton Ruin and Feather Cave would be managed to preserve, protect and interpret unique archeological values, artifacts and architectural features. The area would be called the Feather Cave Archeological Complex. In addition to the management prescribed for the Fort Stanton ACEC that would also apply to the Archeological Complex, the following specific management actions would be applied, as well:

- recreation development would be considered, such as trails to Lower Stanton ruin and Indian Shelter Cave, signs, an interpretive shelter, rest rooms, and a parking area;
- off-site and on-site interpretation would be considered, including site stabilization for interpretive enhancement, exhibits, and signing and brochures.

Fort Stanton would be designated a Special Recreation Management Area with emphasis on providing quality recreational opportunities in concert with other resource programs.

In addition to the 40 miles of multi-use trails already in use, about 45 miles of existing roads or trails and about 20 miles of new trails would be developed and maintained as multi-use trails for hiking, horseback riding and mountain bikes. These trails, comprising about 51 acres, would be closed to the use of OHVs.

Camping at Fort Stanton would be managed by:

- Limiting vehicle camping (driving motorized vehicles to a campsite) to the Rio Bonito and Fort Stanton Cave campgrounds and any other designated campsites. But, in no case would camping be allowed within 100 feet of the Rio Bonito and Salado Creek. About 250 acres would be closed to the use of OHVs in these areas.

- Permitting back country camping throughout Fort Stanton, except within 100 feet of the Rio Bonito and Salado Creek and no closer than 300 feet from wildlife and livestock waters, seeps or springs.
- Limiting all camping to no closer than one-quarter mile from waysides, overlooks, interpretive trails or state highways, except at developed campgrounds and designated campsites.
- Establishing a walk-in primitive campground of 2 to 3 acres along Rio Bonito Creek.

Approximately 24,000 acres would be designated as limited to designated roads and trails for OHV use, to protect soils, cultural resources, and vegetation, including threatened or endangered species.

A wayside stop would be considered for development along U.S. Highway 380 to interpret the historical, archaeological, and recreational opportunities of the area.

Fort Stanton Cave from the entrance to Big Bend would be managed as an underground environmental education classroom. Environmental stations would be established. Minor trail development would be needed to channel students.

Roswell Cave Complex ACEC

The Roswell Cave Complex ACEC consists of nine cave systems. The nine cave systems comprising the Roswell Cave Complex are: Angora-Corn Cave; Bat Hole Cave; Coachwhip Cave; Crockett Cave; Crystal Caverns-Devils Well Caves; Martin-Antelope Gyp Cave; Millrace Cave; Torgac Cave; and Zia Christine Cave. The ACEC comprises 16,818 surface acres. There are 14,894 acres of federal mineral estate in the ACEC, including 3,000 acres under private survace. The surface acreage consists of the following categories and acreages:

Public land, 11,894 acres
Private land, 4,920 acres

Refer to Table 41 for the categories and acreages of lands comprising the ACEC, listed by cave system.

Management Goal:

Protect the natural and scenic values, while allowing for recreational, commercial, scientific and educational use.

Management Prescriptions:

The management prescriptions for Alternative D are the same as those for Alternative B, with the following exception.

All lands in the ACEC would be designated avoidance areas for major rights-of-way.

ALTERNATIVE E (PREFERRED)

Alternative E (the Preferred Alternative) comprises parts of the other alternatives in a mix that attempts to provide as much environmental protection as possible while still meeting the BLM's multiple use mandates. This alternative is more environmentally oriented than either Alternative A or C. It is more production oriented than Alternative B. Alternative E is similar to alternative D, but it is slightly more oriented toward environmental protection than Alternative D.

In this alternative, management proposed for the Carlsbad Resource Area is found only in the Fluid Minerals section under the Minerals Management heading and in appendixes referenced in that section. All other proposed management in this alternative is for the Roswell Resource Area. The term "resource area" applies to the Roswell Resource Area.

The Surface Use and Occupancy Requirements (Appendix 3) would be applied, when applicable, to all actions described in this alternative.

MINERALS MANAGEMENT

Fluid Minerals

Goal: Provide for the leasing, exploration and development of oil and gas resources within the Roswell District. Some existing stipulations may be rescinded, and would be replaced by standard terms and conditions or less restrictive stipulations.

ROSWELL DISTRICT

The BLM administers approximately 13,835,000 acres of federal oil and gas mineral estate in the Roswell District. Under this alternative:

Approximately 13,248,007 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development under the BLM's standard terms and conditions, the Surface Use and Occupancy Requirements for this alternative (Appendix 3), the Roswell District Conditions of Approval (Appendix 4), and the Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas for this alternative (Appendix 5). The discrete components of these requirements would be applied on a case-by-case basis when needed to mitigate impacts or guide use. The Surface Use and Occupancy Requirements would be applied to new leases or as conditions of approval for proposed activities on existing leases, following NEPA analysis. The Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas would be applied as conditions of approval.

As a result of the requirements described above, some existing leasing stipulations would be rescinded or would be replaced by revised stipulations, in both the Carlsbad and Roswell resource areas.

Approximately 110,060 acres (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued.

Approximately 503,846 acres (4 percent) would be closed to leasing. In these areas, existing leases would continue to be developed on a case-by-case basis. However, once leases terminate, they would not be re-offered for leasing.

Produced water disposal pits on public lands would not be allowed west of the Pecos River, within 100-year floodplains or within 200 meters of drainages, playas, water wells, or springs throughout the district. In all other areas of the Roswell District, disposal of produced water in lined pits may be permitted on public lands.

Revegetation of disturbed areas would be required. Reclamation techniques, such as deeper rips, different seed mixtures, mulching, and the applications of fertilizer, would be used to accelerate the reclamation of pits, roads and pads to provide for maximum ground and surface water protection. The removal of caliche from roads and pads could be required to enhance reclamation efforts. Waiver of this requirement would be considered if diligent attempts to revegetate a site have failed and the Authorized Officer determines that further attempts would be futile.

CARLSBAD RESOURCE AREA

The BLM administers approximately 4,095,000 acres of federal oil and gas mineral estate in the Carlsbad Resource Area. Under this alternative:

Approximately 3,906,756 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District." The total acreage includes controlled surface use restrictions and approximately 460,700 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. See Tables 8 and 69, and Map 16.

Approximately 81,147 acres (2 percent) would be open to leasing, with a stipulation that no surface occupancy would be allowed on new leases issued. Refer to Tables 8 and 70, and Map 16. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

TABLE 69
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
CARLSBAD RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas[1]	Hydrocarbon Potential Estimated Surface Acres		
	High	Moderate	Low
BLM MANAGEMENT:			
City of Carlsbad Water Well Field	29,520		
East Guadalupe Escarpment Habitat Management Area		25,600	
Subtotal	29,520	25,600	
OTHER AGENCY MANAGEMENT:			
Air Base City, Hobbs Industrial Air Park	160		
Artesia Airport	200		
Carlsbad Airport	160		
Jal County Airport	280		
Lincoln National Forest	N/A[2]		
Subtotal	800		
Total	30,320	25,600	

[1] Includes areas described in "Management Common to All Alternatives."

[2] Amount of affected acreage not known.

Source: BLM files, 1994.

TABLE 70
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
CARLSBAD RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	 Moderate	 Low
BLM MANAGEMENT:			
Black River Buckwheat Population Area	720		
Chosa Draw ACEC	2,820		
CP Hill Buckwheat Population Area	360		
Guadalupe Escarpment Scenic Area (Zone 1)	11,700		
Laguna Plata Archaeological District	3,360		
Maroon Cliffs Archaeological District	6,840		
Pecos River Canyon Complex ACEC/RNA[2]	4,505		
Poco Site	265		
Pope's Well	80		
Seven Rivers Hills HMA	540		
South Texas Hill RNA		3,600	
Yeso Hills RNA	557		
Subtotal	31,747	3,600	
OTHER AGENCY MANAGEMENT:			
Avalon Reservoir	14,800		
Brantley Lake State Park	10,000		
Brantley Reservoir	21,000		
Lincoln National Forest	N/A[3]		
Subtotal	45,800		
Total	77,547	3,600	

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. Because of the nature of the Requirements and their use, areas listed above may also include areas to which the Requirements would be applied. Refer to Table A3-1 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1] Includes areas described in "Management Common to All Alternatives."

[2] Acreage increase by 40 acres over Alternative A, to accommodate T&E species habitat.

[3] Amount of affected acreage not known.

Source: BLM files, 1994.

Approximately 107,097 acres (3 percent) would be closed to leasing to protect special resources or to support other public uses. See Tables 8 and 71, and Map 16. In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

In the Carlsbad RMP, a number of areas were designated as special management areas. A variety of management practices were prescribed, including oil and gas stipulations. The use of the Surface Use and Occupancy Requirements, and reliance on off-road vehicle designations and visual resource management prescriptions established in the Carlsbad RMP make the continued use of oil and gas leasing stipulations unnecessary on the following areas:

Blue Spring
Bogle Flat Spring
Little McKittrick Draw HMA
Owl Spring
Preservation Spring
Southern Gypsum Soil Area
Lesser prairie chicken habitat areas
Heron rookeries
Ben Slaughter Draw
Bluntnose Shiner HMA
Cottonwood Spring
Fence Canyon Caves
Honest Injun Cave
KFF Caverns
Lost Cave
Pecos River Corridor
Yellow Jacket/Lair Caves

Existing oil and gas leasing stipulations for these areas would no longer be used under this alternative. The proposed changes are summarized in Table 21. Other management prescribed in the Carlsbad RMP for these areas would not change, and these areas would still be managed as special management areas. If needed, standardized lease notices would be used to provide information about OHV and VRM requirements to purchasers of leases.

The Maroon Cliffs Archeological District was established in the Carlsbad RMP. Under this alternative, the size of the area would increase from 11,783 acres to 17,720 acres to include important areas of cultural resources. Management of oil and gas activity would be changed from no surface occupancy on 1,880 acres under Alternative A to no surface occupancy on 6,840 acres and no leasing on 10,880 acres. Other management prescriptions identified in the Carlsbad RMP would remain unchanged and would apply to the entire acreage of the archeological district. Refer to Tables 70 and 71, and Map 24.

ROSWELL RESOURCE AREA

The BLM administers approximately 9,740,000 acres of federal oil and gas mineral estate in the Roswell Resource Area. Under this alternative:

Approximately 9,312,388 acres (96 percent of the oil and gas mineral estate) would be open to leasing and development as described above under "Roswell District". This total includes controlled surface use restrictions and approximately 935,000 acres of lesser prairie chicken habitat that would be open to leasing with timing restrictions. See Tables 13 and 72, and Map 11.

Approximately 28,913 (< 1 percent) would be open to leasing, with a stipulation that No Surface Occupancy would be allowed on new leases issued. Refer to Tables 13 and 73, and Map 11. This does not include acreage that may be affected by application of the Surface Use and Occupancy Requirements.

Approximately 398,749 acres (4 percent) would be closed to leasing to protect resources or to support other public uses. See Tables 13 and 74, and Map 11). In these areas, existing leases would continue to be developed on a case-by-case basis, However, once leases terminate, they would not be re-offered for leasing.

Locatable Minerals

Goal: Continue to keep lands available to locatable minerals while maintaining important environmental values.

The areas summarized in Table 75 and shown on Map 9 would be withdrawn from all forms of appropriation under the general mining laws.

TABLE 71
AREAS CLOSED TO FUTURE LEASING
CARLSBAD RESOURCE AREA - ALTERNATIVE E (PREFERRED)

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Cave Protection Zones (Dark Canyon)	10,120		
Devils Den WSA	320		
Little Walt Canyon Quarry Site	40		
Lonesome Ridge WSA[2]	3,505		
McKittrick Canyon WSA	200		
McKittrick Hill Cave	5,240		
Maroon Cliffs Archaeological District	10,880		
Mudgetts WSA[3]	1,060		
Subtotal	31,365		
OTHER AGENCY MANAGEMENT:			
Carlsbad Caverns National Park/Wilderness	46,530		
Gnome Site	680		
Lincoln National Forest	26,282		
Living Desert State Park	1,520		
State Militia Site	720		
Subtotal	75,732		
Total	107,097		

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[1] Includes areas described in "Management Common to all Alternatives."

[2] The 2,990-acre Lonesome Ridge ACEC is within the Lonesome Ridge WSA. The ACEC would remain closed to leasing even if the WSA is not designated as wilderness.

[3] Acreage shown is that part of the WSA outside the cave protection zones, which would become available for leasing if the WSA is not designated as wilderness.

Source: BLM files, 1994.

TABLE 72
AREAS OPEN TO LEASING WITH CONTROLLED SURFACE USE RESTRICTIONS
ROSWELL RESOURCE AREA - ALTERNATIVE E (PREFERRED)

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
OTHER AGENCY MANAGEMENT:			
Santa Rosa Municipal Airport	320		
Melrose Bombing Range, buffer area	1,000		
Total	1,320		

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[1] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

TABLE 73
AREAS OPEN TO LEASING WITH NO SURFACE OCCUPANCY
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas[1]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Alleged UFO Crash Sites[2]	1,120		2,560
Billy the Kid Recreation Site	80		
Border Hill NNL		150	
Garnsey Bison Kill Site	520		
Haystack Mountain OHV Area	3,520		
Mescalero Sands ACEC	7,888		
Overflow Wetlands ACEC	1,040		
Valley of Fires Recreation Area	463		
Subtotal	14,631	150	2,560
OTHER AGENCY MANAGEMENT:			
Cibola National Forest			N/A[3]
Fort Sumner Project and Sumner Lake State Park	11,240		
Lincoln National Forest			N/A[3]
Tucumcari Project	7		
Ute Lake State Park	325		
Subtotal	11,572		
Total	26,203	150	2,560

Note: Acreage affected by the application of the Surface Use and Occupancy Requirements is not displayed on this table, to avoid double-counting. because of the nature of the Requirements and their use, areas listed above may also included areas to which the Requirements would be applied. Refer to Table A3-2 in Appendix 3 for estimates of additional acreage that could be affected by the Requirements.

[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

[3] Amount of acreage not known.

Source: BLM files, 1994.

TABLE 74
AREAS CLOSED TO FUTURE LEASING
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas[1/]	Hydrocarbon Potential Estimated Surface Acres High	Moderate	Low
BLM MANAGEMENT:			
Carrizozo Lave Flow and Little Black Peak WSAs		25,312	
Cocklebur Lakes Archaeological District	2,360		
Fort Stanton ACEC			27,622
Haystack Butte Archaeological District	3,400		
Mathers Research Natural Area	242		
Mescalero Sands ACEC	7,931		
North Pecos River ACEC	2,080		
Roswell Cave Complex ACEC	12,654	1,600	640
Subtotal	28,667	26,912	28,262
OTHER AGENCY MANAGEMENT:			
Bitter Lake National Wildlife Refuge	6,320		
Bottomless Lakes State Park	460		
Cibola National Forest			19,178
Grulla National Wildlife Refuge	69		
Lincoln National Forest			99,171
Melrose Bombing Range, core area	6,714		
Salt Creek Wilderness	2,240		
White Sands Missile Range		180,756	
Subtotal	15,803	180,756	118,349
Total	44,470	207,668	146,611

[1/] Includes areas described in "Management Common to All Alternatives."

Source: BLM files, 1994.

TABLE 75
AREAS WITHDRAWN FROM MINERAL ENTRY
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Area[1]	Estimated Mineral Acres
BLM MANAGEMENT:	
Alleged UFO Crash Sites[2]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area (staging area)	160
Mathers Research Natural Area	242
Mescalero Sands ACEC[3]	7,931
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	1,040
Roswell Cave Complex ACEC[4]	14,894
Spring and Seep Areas	240
Valley of Fires Recreation Area	463
Subtotal	93,294
OTHER AGENCY MANAGEMENT:	
Blackwater Draw Archaeological Site	711
Canal Right-of-Way (NM 21834)	7
Melrose Bombing Range, core area	6,714
Nike Hercules Defense Site	325
NM Army National Guard Training Site	53
North Pecos River ACEC	4,200
Fort Sumner Dam and Sumner Lake State Park	8,123
Tucumcari Project, Conchas Canal (NM 52398)	7
Two Rivers Reservoir Project	2,590
Subtotal	22,730
Total	116,024

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[1] Includes areas described under "Management Common to All Alternatives."

[2] Two alleged sites.

[3] Includes as many as 6,617 acres originally in the Mescalero Sand Recreation Complex.

[4] Includes original 40-acre withdrawal on Torgac Cave.

Source: BLM files, 1994.

Solid Leasable Minerals

Goal: Keep lands available for leasing and production, while maintaining important environmental values.

Lands in the following area would remain closed to leasing:

- Mathers Research Natural Area, 242 acres

Additional public lands that would be closed to solid mineral leasing are summarized in Table 76 and are shown on Map 19.

Saleable Minerals

Goal: Provide mineral materials to the public while maintaining the protection necessary to prevent adverse environmental impacts and to minimize impacts to public health and safety.

Mineral material pits no longer in use or selected pits in areas with a high density of pits would be reclaimed. Pits would be reclaimed to standards that would conform to, or improve, the condition of the surrounding ecosystem.

All federal mineral estate at Fort Stanton would be open to the disposal of mineral materials.

The areas that would be closed to mineral material disposals to preclude surface disturbance are summarized in Table 77 and are shown on Map 20.

LANDS AND REALTY MANAGEMENT

Goal: Manage the public lands to support the goals and objectives of other resource programs, to respond to public demand for land use authorizations, and to acquire administrative and public access where necessary.

Utility and Transportation System

Public lands in the resource area would be made available for rights-of-way, permits, and leases. In defined exclusion and avoidance areas, public lands would be open to the consideration of granting rights-of-way under strict guidelines that could limit or eliminate opportunities for locating rights-of-way. Areas proposed for exclusion of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 78 and are shown on Map 12.

Lands acquired as habitat for Special Status Species or acquired for wetland/riparian values would be added to the right-of-way exclusion area for major projects. Exceptions would be considered in exclusion zones on a case-by-case basis for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines.

Areas proposed for avoidance of rights-of-way for major projects such as electric transmission lines; pipelines 10 inches in diameter or larger; communication lines for interstate use; federal, state and interstate highways; and major county and private roads are summarized in Table 79 and are shown on Map 21. Rights-of-way for major projects and for facilities such as fences, range and wildlife water pipelines, power distribution lines, access to oil and gas facilities, or oil and gas collection or distribution pipelines would be considered in avoidance zones on a case-by-case basis.

No additional rights-of-way corridors would be designated.

See management common to all alternatives for a description of the existing corridor.

Acquisition

As many as 3,000 acres of private or state lands along the Rio Bonito would be considered for acquisition to enhance management of the Fort Stanton area.

Over the life of the plan, the acquisition of an estimated 93,000 acres of non-federal lands or interests in non-federal lands, in addition to the Rio Bonito lands, would be considered on a case-by-case basis to achieve management objectives. Refer to Appendix 8 for acquisition criteria. Any lands acquired would be managed according to the

TABLE 76
AREAS CLOSED TO SOLID MINERAL LEASING
ROSWELL RESOURCE AREA -- ALTERNATIVE E (PREFERRED)

Areas[1/]	Estimated Mineral Acres
Alleged UFO Crash Sites[2/]	3,680
Billy the Kid Recreation Site	80
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	27,622
Garnsey Bison Kill Site	880
Haystack Butte Archaeological District	3,400
Haystack Mountain OHV Area	3,520
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,931
Mescalero Sands North Dune OHV Area	610
North Pecos River ACEC	4,200
Overflow Wetlands ACEC	1,040
Roswell Cave Complex ACEC	14,894
Valley of Fires Recreation Area	463
Total	97,024

[1/] Includes areas described under "Management Common to All Alternatives."

[2/] Two alleged sites.

Source: BLM files, 1994.

TABLE 77
AREAS CLOSED TO THE DISPOSAL OF MINERAL MATERIALS
ROSWELL RESOURCE AREA -- ALTERNATIVE E (PREFERRED)

Areas		Estimated Mineral Acres
Alleged UFO Crash Sites[1/]		3,680
Billy the Kid Recreation Site		80
Border Hill NNL		150
Carrizozo Lava Flow and Little Black Peak WSAs		25,312
Cocklebur Lakes Archaeological District	3,000	
Feather Cave Archaeological Complex		330
Garnsey Bison Kill Site		880
Haystack Butte Archaeological District		3,400
Haystack Mountain OHV Area		3,520
Mathers Research Natural Area		242
Mescalero Sands ACEC		7,931
Mescalero Sands North Dune OHV Area	1,336	
North Pecos River ACEC		4,200
Overflow Wetlands ACEC		1,040
Roswell Cave Complex ACEC		14,894
Valley of Fires Recreation Area		463
Total		70,458

[1/] Two alleged sites.

Source: BLM files, 1994.

TABLE 78
RIGHTS-OF-WAY EXCLUSION AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas	Estimated Acres
Alleged UFO Crash Sites[1]	3,680
Border Hill NNL	150
Carrizozo Lava Flow and Little Black Peak WSAs	25,312
Cocklebur Lakes Archaeological District	3,000
Fort Stanton ACEC	24,630
Garnsey Bison Kill Site	360
Haystack Butte Archaeological District	3,400
Mathers Research Natural Area	242
Mescalero Sands ACEC	7,888
North Pecos River ACEC	3,360
Overflow Wetlands ACEC	3,000
Rio Bonito[2]	3,000
Roswell Cave Complex ACEC	14,894
U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)	76
Valley of Fires Recreation Area	463
Total	93,455

[1] Two alleged sites.

[2] Includes the Rio Bonito acquired lands, Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

TABLE 79
RIGHTS-OF-WAY AVOIDANCE AREAS
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas	Estimated Acres
Core Prairie Chicken Habitat area	245,000
Haystack Mountain OHV area (applies to overhead power and telephone lines)	4,153
Mescalero Sand Dunes North OHV area (applies to overhead power and telephone lines)	610
North Pecos River ACEC	3,362
Total	253,125

Source: BLM files, 1994.

management prescriptions in this alternative.

The areas summarized in Table 80, shown on Map 13, and described in Appendix 9 are currently identified as being suitable for consideration for acquisition, as opportunities become available.

Easements would be acquired to provide access to public lands for recreation, wildlife, range, cultural/historical, mineral, ACEC, special management area and other resource needs, as opportunities arise. Criteria for the acquisition of easements are described in Appendix 8. Easements are needed in the following areas:

- Overflow Wetlands WHA
- Crockett Cave
- Crystal Cave
- Millrace Cave
- Little Black Peak Cinder Cone east access
- Little Black Peak Cinder Cone west access
- Carrizozo Lava Flow WSA lower windmill east access
- Mescalero Sands ACEC east access
- Mescalero Sands ACEC west access

TABLE 80
LANDS CONSIDERED SUITABLE FOR POTENTIAL ACQUISITION
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Areas	Private	State
Caprock WHA Expansion	8,480	18,969
Carrizozo Lava Flow and Little Black Peak WSAs	5,512	4,321
Cedar Hills & Pecos River Deer Management Areas		3,521
Fort Stanton Area		1,320
Garnsey Bison Kill Site	200	320
Haystack Butte Archaeological District	40	640
Mescalero Sands ACEC	320	1,800
Mescalero Sands North Dune OHV Area	410	
North Pecos River ACEC	1,880	1,160
Overflow Wetlands ACEC	2,100	1,700
Playa Lakes	1,051	590
Rio Bonito[1/]	1,018	1,982
Roswell Cave Complex ACEC	4,920	
Valley of Fires Recreation Area	493	19
Total	26,424	36,342

[1/] Includes the Rio Bonito Waterfall, lands along the Rio Bonito adjacent to Fort Stanton ACEC, and NMSU facilities at Fort Stanton.

Source: BLM files, 1994.

Disposal

The disposal of an estimated 150,000 acres of public lands (e.g., transfer from the administration of the BLM to other federal agencies, or local or state governments, or disposal through methods such as exchange, public sale, State indemnity selection, or Recreation and Public Purposes leases or patents) would be considered on a case-by-case basis. Appendix 10 includes a list of tracts totalling 58,490 acres already identified that would be suitable for consideration for disposal. Prior to any disposal action, these lands, and any others proposed for disposal, would be evaluated for compliance with the disposal criteria that are also listed in Appendix 8.

LIVESTOCK GRAZING MANAGEMENT

Goal: Provide effective and efficient management of allotments to maintain, improve, and monitor range conditions.

Rangeland improvements and vegetation treatments would continue to be implemented to improve or maintain forage production and range condition, in an effort to achieve the Desired Plant Community. Watershed and wildlife habitat management and livestock production needs would be considered equally.

The following are the types and estimates, based projected demand, of new projects that would be implemented over 20 years under this alternative. Funding priority would given to "I" category allotments with allotment management plans.

- 150 miles of water pipeline
- 150 water development projects, including wells, storages, troughs, or dirt tanks.
- 75 miles of fence construction.

Specific grazing systems would be developed, in coordination with permittees, on allotments in the Caprock Wildlife Habitat Area (WHA) to meet DPC objectives.

The stocking rate of sheep in the Macho WHA in areas currently supporting antelope, and which meet transplant criteria, must not exceed an average of 50 sheep per section per allotment over the course of the grazing year.

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan. On other acquired lands, establishing grazing preference would be considered on a case-by-case basis, depending on the purpose for which the lands were acquired and the management objectives for those lands.

Management proposed in this alternative would result in a reduction in the amount of livestock grazing authorized on the public lands. Table 19 summarizes estimated AUM (animal unit month) reductions that may result from certain management actions.

Livestock stocking rates would be adjusted under certain circumstances to reduce or eliminate conflicts with recreation use and development, and to reduce the cost of facility maintenance. Adjustments would include excluding livestock from developed recreation facilities and within fenced exclosures around caves.

VEGETATION MANAGEMENT

Goal: Manage resources to maintain or improve vegetation with the emphasis on watershed protection and forage for wildlife.

General management objectives, the composition of plant communities identified as a desired plant community (DPC), and practices proposed for use in meeting the management objectives and DPC are described below. In all cases, an ecological site must be capable or attaining the DPC through natural succession, management action, or both. Refer to Appendix 11 for more information on plant communities and the development of the DPC process.

Watershed, wildlife and livestock management objectives for each community, except the Mixed Shrub Malpais Community, are to improve vegetation composition and production in areas that currently do not meet the vegetation condition objectives and maintain vegetation condition in areas that do. The management objectives for the Mixed Shrub Malpais Community are to maintain the current vegetation composition and production levels.

The standard practices that could be employed to meet a DPC would be based on thresholds and vegetation condition objectives described below for each community type. The specific practices to be used and the numbers of acres affected would be determined during activity planning, based on the results of resource monitoring. During activity planning, specific resource condition objectives would be developed for a distinct area (e.g., an allotment) based on the planned use of the area and the more general vegetation condition objectives developed in this land use plan.

The standard practices that would be employed to meet management objectives in each community are:

- Utilization levels not exceeding 45 percent of annual plant production. Utilization levels would be determined prior to green-up, and measured on key forage species.

- Projects such as fences, water developments, erosion control structures, reseedings, or vegetative sales.

- Grazing treatments such as changes in season of use, class of livestock, or stocking rates.

- Vegetation treatments, including, prescribed fire or prescribed natural fire; fuelwood sales; and biological, chemical or mechanical controls.

Constraints on treatments for each community are:

- A project area would not be chemically treated until the chemical treatment of an adjacent project area has been in place at least five years.

Grassland Community

Refer to Table 81 for Grassland Community vegetation condition objectives.

Vegetation treatments to influence DPC would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Catclaw	50 plants/acre
Creosote	20% of the vegetative canopy
Lechuguilla	20% of the vegetative canopy
Tarbush	20% of the vegetative canopy
Broom snakeweed	25% by weight of vegetative production
Pinon/juniper	50 trees/acre

Shinnery Oak-Dune Community

Refer to Table 82 for Shinnery Oak-Dune Community vegetation condition objectives.

The SOD community type on 91 of the 242 acres in the Mathers Research Natural Area would not be grazed by livestock. The entire Natural Area would be used for wildlife population and habitat studies. Those studies may entail vegetative treatments and DPC may not be reached. Likewise, DPC may not be reached in the Mescalero Sands North Dune OHV Recreation Area, which would be managed primarily for off-road vehicle recreational activities, and in the proposed Mescalero Sands ACEC, which would be managed according to the prescriptions for the ACEC.

Vegetation treatments to influence DPC in the shinnery oak-dune community would be considered at the following threshold:

Mesquite	50 plants/acre

Constraints on treatments in the shinnery oak-dune community are:

- Treatments may be conducted to achieve DPC objectives in areas that are not considered suitable or occupied habitat for the dune sagebrush lizard, or for other special status species that may be identified.

TABLE 81
VEGETATION MANAGEMENT - GRASSLAND COMMUNITY
ALTERNATIVE E (PREFERRED)

	Vegetative Community Objectives % Cover	Vegetative Cover By % Composition	% Composition By Weight
Grass/Forbs	15-52		
Grasses		30-45	60-90
Forbs		10-15	10-30
Shrubs/Trees	3-12		
Shrubs		1-10	15-25
Trees			1-10
Bare Ground	14-60		
Small Rock/Large Rock	0-30		
Litter	8-44		

Note: Vegetation composition in any given pasture must include a minimum of 10 genera of fall forbs preferred by pronghorn antelope.

Source: BLM files, 1994.

TABLE 82
VEGETATION MANAGEMENT - SHINNERY OAK-DUNE COMMUNITY
ALTERNATIVE E (PREFERRED)

	Vegetative Community Objectives % Cover	Vegetative Cover By % Composition	% Composition By Weight
Grass/Forbs	16-40		
Grasses		50-70	60-80
Forbs		10-15	10-30
Shrubs/Trees	3-17		
Shrubs		25-40	15-25
Trees			1-10
Bare Ground	5-20		
Small Rock/Large Rock	0-1		
Litter	25-70		

Source: BLM files, 1994.

Mixed Shrub Malpais Community

Watershed, wildlife and livestock management objectives for the mixed shrub malpais community are to maintain the current vegetation composition and production levels.

Refer to Table 83 for Mixed Shrub Malpais Community vegetation condition objectives.

Constraints on the management of vegetation in the mixed shrub malpais community are:

- No changes would be made in current livestock management.
- No projects would be constructed in the Malpais.

Pinon-Juniper Grassland Community

Refer to Table 84 for Pinon-Juniper Grassland Community vegetation condition objectives.

A mosaic of different vegetation structure and composition is needed to enhance wildlife habitat in this community type. Primary management emphasis would be on the desirable shrub component to improve mule deer, elk, Mearn's quail, and Kuenzler cactus habitats.

Vegetation treatments to influence DPC in the pinon-juniper grassland community would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Broom snakeweed	25% by weight of vegetative production
Pinon/juniper	150 trees/acre

Constraints on treatments in the pinon-juniper community are:

- Removal of trees would be done to create edge and mosaic patterns.

Mixed Desert Shrub Community

Refer to Table 85 for Mixed Desert Shrub Community vegetation condition objectives.

Vegetation treatments to influence DPC in the mixed desert shrub community would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Catclaw	50 plants/acre
Creosote	20% of the vegetative canopy
Lechuguilla	20% of the vegetative canopy
Tarbush	20% of the vegetative canopy
Broom snakeweed	25% by weight of vegetative production
Pinon/juniper	50 trees per acre

Drainages, Draws and Canyons Community

Refer to Table 86 for Drainages, Draws and Canyons Community vegetation condition objectives.

Vegetation treatments to influence DPC in the drainages, draws and canyons community would be considered at the following threshold levels:

Mesquite	50 plants/acre
Cholla	100 plants/acre
Salt Cedar	25 plants/acre
Catclaw	50 plants/acre
Creosote	20% of the vegetative canopy
Lechuguilla	20% of the vegetative canopy
Tarbush	20% of the vegetative canopy
Broom snakeweed	25% by weight of vegetative production

Constraints on treatments in the drainages, draws and canyons community are:

- Browse species would be protected.
- Riparian-wetland vegetation would be protected by methods such as developing riparian pastures, establishing upland waters, and conducting salt cedar control.

TABLE 83
VEGETATION MANAGEMENT - MIXED SHRUB MALPAIS COMMUNITY
ALTERNATIVE E (PREFERRED)

	Existing % Cover	Existing Composition By % Weight
Grass/Forbs	20	
Grasses		80
Forbs		3
Shrubs/Trees	4	
Shrubs		16
Trees	0	1-10
Bare Ground	23	
Small Rock/Large Rock	41	
Litter	12	

Source: BLM files, 1994.

TABLE 84
VEGETATION MANAGEMENT - PINON-JUNIPER GRASSLAND COMMUNITY
ALTERNATIVE E (PREFERRED)

	Vegetative Community Objectives		
	% Cover	Vegetative Cover By % Composition	% Composition By Weight
Grass/Forbs	15-35		
Grasses		30-40	50-85
Forbs		3-10	5-15
Shrubs/Trees	10-25		
Shrubs		20-35	15-25
Trees		30-40	3-10
Bare Ground	12-24		
Small Rock/Large Rock	5-35		
Litter	10-20		

Source: BLM files, 1994.

TABLE 85
VEGETATION MANAGEMENT - MIXED DESERT SHRUB COMMUNITY ALTERNATIVE E (PREFERRED)

	Vegetative Community Objectives % Cover	%Composition By Weight
Grass/Forbs	11-28	
Grasses		50-80
Forbs		10-20
Shrubs/Trees	6-15	
Shrubs		10-30
Trees		1-10
Bare Ground	10-40	
Small Rock/Large Rock	15-35	
Litter	1-12	

Source: BLM files, 1994.

TABLE 86
VEGETATION MANAGEMENT - DRAINAGES, DRAWS, AND CANYONS COMMUNITY ALTERNATIVE E (PREFERRED)

	Vegetative Community Objective % Cover	% Composition By Weight
Grass/Forbs	15-45	
Grasses		50-80
Forbs		10-20
Shrubs/Trees	3-20	
Shrubs		10-30
Trees		1-10
Bare Ground	0-60	
Small Rock/Large Rock	0-40	
Litter	4-43	

Source: BLM files, 1994.

Riparian-Wetlands Community

There is no current management objective based on Ecological Range Site Goals for the riparian-wetlands community. Riparian management objectives require more specific plant community prescriptions to meet these goals. Current SCS range site descriptions do not adequately describe potential plant communities for riparian-wetland areas.

Rio Bonito Acquired Lands

Vegetation management on the acquired Rio Bonito lands would be developed under specific Ecological Range Site Goals which would include agricultural crops established on existing tillable acreage using water rights obtained with the acreage. Crops, including apple orchards, and tame pasture species such as hay, winterwheat, fescues, and orchard grass, would be selected for use by wildlife.

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan.

If livestock grazing is allowed, excess forage could be used for limited grazing in late winter or early spring. Livestock grazing on the Rio Bonito acquired lands would be held to a level at which 45 percent of current year's forage growth would remain after all uses.

CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT

Goal: Increase the protection of, and knowledge derived from, significant archeological and historic properties known now and those discovered in the future.

Cultural sites would be managed to preserve a higher percentage of the total number of sites with a secondary emphasis on studying them for their information.

Approximately 20 percent of the recorded archeological sites in the resource area would be managed for conservation. The management objective for conservation would be to preserve existing archeological values. This would be achieved by protecting sites from damage by natural processes such as erosion and from man-caused damage such as illegal artifact collecting and from legally authorized surface disturbing activities. The Paleoindian sites, such as those in the Haystack Butte area would fall into this category.

Approximately five percent of the recorded archeological sites in the resource area would be managed to emphasize public values and interpretation. The management objective for public values and interpretation would be to develop archeological properties for public use. This would be achieved by scientifically treating a site, such as by excavation and developing exhibits so that the cultural property is interpreted for public recreation and education. The Garnsey Bison Kill site near Bottomless Lakes and Lower Stanton Ruin-Feather Cave near Fort Stanton are two sites that would lend themselves to interpretation.

Approximately 75 percent of the recorded archeological sites would be managed for information use. Management would emphasize the use of cultural properties for the purpose of gaining knowledge. This would be achieved by scientifically studying the property in whatever ways are appropriate in order to extract as much information as possible. Two sites which are currently being studied are the Upper Bonito I and Lower Stanton Ruin.

An area of 3,400 acres at Haystack Butte would be nominated for a National Register Archeological District (Map 22). Management of the District would emphasize protection of the very high density of well preserved sites. A secondary emphasis would be the study of selected sites to increase knowledge of the area. Both the outright acquisition of, or conservation easements on, about 640 acres of state land and 40 acres of private land would be considered if the opportunity arose, and added to the District, bringing the total acreage to 4,080 (see Table 80). Any acquired lands would be managed according to the management prescriptions for this alternative. In order to classify the cultural properties in an area, the sites would need to be studied. Once sites were selected for interpretation or for further study to increase knowledge, activity plans would be prepared and approved before implementation. The following management actions would be employed in management of the site: (See Tables 74, 75, 76, 77, 78, and 87.)

- oil and gas: closed to leasing
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: exclusion area for major rights-of-way
- OHV designations: OHV use limited to designated roads and trails

Approximately 3,000 acres of BLM-administered land at Cocklebur Lakes would be nominated for a National Register Archeological District (Map 22). Management of the District would emphasize protection of the very high density of well-preserved sites for the primary purpose of future interpretation. A secondary emphasis would be the study of selected sites to increase knowledge of the area. The Cocklebur Lakes area would require some amount of study in order to be able to determine the level of management required for the sites. The following management actions would be employed in management of the site: (See Tables 74, 75, 76, 77, 78, and 87.)

- oil and gas: closed to leasing
- locatable minerals: withdraw from entry
- solid leasable minerals: closed to leasing
- mineral materials (saleables): closed to disposal
- rights-of-way: exclusion area for major rights-of-way
- OHV designations: OHV use limited to designated roads and trails

Approximately 360 acres of public lands at the Garnsey Bison Kill Site would be managed to protect the bison kill site and associated archeological sites (see Map 23). One management goal would be to allow the public to see an archeological-paleontological site exposed in the sides of the arroyo running through the site. Some of the site would be stabilized, protecting the archeological and paleontological values. Another goal would be to generate appreciation of archeology and paleontology by developing a trail with interpretive signs and markers, and other on-site and off-site interpretive techniques. Other development of the site could include site stabilization, exhibits, and a parking area. Both the outright acquisition of, or conservation easements on, about 200 acres of private land surface and about 320 acres of state land surface would be considered to enhance the management and development of the area (see Table 80). The total acreage would then be about 880 acres. Any acquired lands would be managed according to the management prescriptions for this alternative. The BLM would continue with its plans to interpret this site even if no additional lands are acquired. The following management actions would be employed in management of the site, for public surface (360 acres) and mineral estate (520 acres): (See Tables 73, 75, 76, 77, 78, and 87.)

- oil and gas: open to leasing with "no surface occupancy"
- locatable minerals: withdraw from entry
- solid leasable minerals: close to leasing
- saleable minerals: close to disposal
- rights-of-way: exclusion area for major rights-of-way
- livestock grazing: 120 acres closed to grazing
- OHV designations: 120 acres closed to OHV use; OHV use limited to designated roads and trails on 240 acres

Following a Class 3 inventory and some preliminary research, eligible sites on the acquired Rio Bonito lands would be managed for information, public values or conservation, as appropriate.

TABLE 87
OFF-HIGHWAY VEHICLE MANAGEMENT DESIGNATIONS
ROSWELL RESOURCE AREA
ALTERNATIVE E (PREFERRED)

Designation	Areas[1]	Acres
Closed	Alleged UFO Crash Sites[2]	3,680
	Border Hill NNL	150
	Carrizozo Lava Flow and Little Black Peak WSAs	25,312
	Comanche Hill "A" Area	660
	Comanche Hill "B" Area	883
	Comanche Hill "C" Area	240
	Feather Cave Archaeological Complex	330
	Fort Stanton ACEC: Rio Bonito, and Salado Creek Area	250
	Fort Stanton ACEC: Trails (105 miles)	51
	Garnsey Bison Kill Site	120
	Mathers RNA	242
	Mescalero Sands ACEC	2,478
	Overflow Wetlands ACEC	1,040
	Playa and Alkali Lakes	2,000
	Roswell Cave Complex ACEC[3]	500
	Springs and Seeps	240
	Valley of Fires Recreation Area	400
Total Closed		38,576
Limited Designated Roads/Trails	Billy the Kid Recreation Site	80
	Cocklebur Lakes Archaeological District	3,000
	Dunahoo Hills (ATVs less than 50 inches)	640
	Fort Stanton ACEC	23,999
	Garnsey Bison Kill Site	240
	Haystack Butte Archaeological District	3,400
	Haystack Mountain OHV Area (ATVs less than 50 in.)	3,500
	Mescalero Sands ACEC	5,410
	Overflow Wetlands ACEC	2,100
	North Pecos River ACEC	3,360
	Pecos River Floodplain	19,200
	Remainder of Resource Area	1,372,392
	Rio Bonito Acquired Lands	1,100
	Roswell Cave Complex ACEC	11,394
	Valley of Fires Recreation Area	63
Total Limited		1,449,878
Open	Mescalero Sands North Dune OHV Area	1,546
Total Open		1,546

[1] Includes areas described in "Management Common to All Alternatives."

[2] Two alleged sites.

[3] Includes an additional 480 acres that fall within Wilderness Study Area OHV closures that are not reflected in cave ACEC closures summary.

Source: BLM files, 1994.

The management goals would be to interpret some cultural sites for the public, research some of the sites for the information they contain and to conserve those sites that meet the criteria for conservation. One opportunity for interpretation is the early Hispanic community of Las Chosas. This site is located on Tract 5 and would require extensive excavation and reconstruction.

There has been considerable interest in trying to identify the location of the alleged 1947 UFO crash site(s). If such an event was determined to have occurred on BLM-administered land, the BLM would interpret and protect the area(s) by:

- excluding the lands from rights-of-way location;
- withdrawing the lands from mining claim location;
- closing the lands to solid mineral leasing;
- closing the lands to disposal of mineral materials;
- leasing oil and gas with no surface occupancy stipulations; and
- closing the lands to OHV use.

The site(s) would be retained in federal ownership.

OUTDOOR RECREATION MANAGEMENT

Recreation Management

Goal: Ensure the continued availability of outdoor recreation opportunities and experiences that are not readily available on adjacent public or private lands. Protect the health and safety of visitors and natural, cultural, and other resource values. Stimulate public enjoyment of public land and resolve user conflicts.

The Mescalero Sands ACEC, Fort Stanton ACEC, Overflow Wetlands ACEC, Roswell Cave Complex ACEC, Mescalero Sands North Dunes OHV Area, Haystack Mountain OHV Area, Garnsey Bison Kill Site, Rio Bonito acquired lands, Billy the Kid Recreation Site and Valley of Fires Recreation Area would be designated Special Recreation Management Areas (refer to Map 23). The public lands not designated Special Recreation Management Areas would be designated an Extensive Recreation Management Area (ERMA).

At the Valley of Fires Recreation Area, approximately four miles of additional hiking trails would be developed to provide access from the campground through the lava flow to the Cooper Cabin. Other recreation facilities, trails and roads at the Valley of Fires Recreation Area would be developed and maintained in accordance with the established plan for the area. About 493 acres of private land and 19 acres of state land on the east side of the presently developed area would be considered for acquisition, to provide space for future expansion of the developed area.

Lands acquired along the Rio Bonito near Lincoln (Tracts 1-4) would be managed for low intensity recreational use. Recreation activities that would be emphasized are fishing, nature viewing and non-trail hiking. The development of two small day-use areas on Tracts 1 and 4 would be considered. Development at these sites would include dirt access roads and parking areas. If Tract 5 is acquired, future intensive development would be considered, including the possible development of a full-service campground of 25 to 50 sites. Livestock grazing would be excluded from the Tract 5 site.

The Billy the Kid Recreation Site (80 acres of BLM-administered land) would be managed and developed for a day-use area, with emphasis on providing access to the Pecos River and fishing. Development could include trails, picnic sites, roads and interpretive displays. Livestock grazing would be excluded from the site.

The Garnsey Bison Kill Site would be managed as an outdoor archaeological and paleontological classroom with emphasis on cultural and natural resource protection. Development could include exhibits, stabilization, self-guided interpretive trails, interpretive stations, and a parking area. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

An 86-mile Back Country Byway would be developed from Roswell to Capitan along State Highway 246, the Pine Lodge Road. Additional byways would be identified and evaluated for future designation and development. Future designations would be considered for roads or trails having high scenic value, unique geologic formations, botanical or biological features, historical or archaeological features, water attractions or other features with high public value.

The areas listed below and in Table 74 would be closed to the leasing of oil and gas.

- Mathers Research Natural Area

The areas listed below and in Table 73 would be open to the leasing of oil and gas with "no surface occupancy."

- Border Hill NNL
- Mescalero Sands North Dune ACEC
- Haystack Mountain OHV Area
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 75 would be proposed for withdrawal from entry or appropriation under the public land laws, including the general mining laws.

- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Haystack Mountain OHV Area (staging area)
- Valley of Fires Recreation Area
- Billy the Kid Recreation Site

The areas listed below and in Table 76 would closed to the leasing of solid minerals.

- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Valley of Fires Recreation Area
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV area
- Billy the Kid Recreation Site

The areas listed below and in Table 77 would closed to the disposal of mineral materials (saleable minerals).

- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL
- Haystack Mountain OHV Area
- Mescalero Sands North Dune OHV area
- Mathers Research Natural Area
- Billy the Kid Recreation Site
- Valley of Fires Recreation Area

The areas listed below and in Table 78 would be excluded from major rights-of-way.

- Rio Bonito acquired lands
- Mathers Research Natural Area
- Valley of Fires Recreation Area
- U.S. Highway 380 corridor through the Carrizozo Lava Flow (applies to overhead power and telephone lines)
- Little Black Peak and Carrizozo Lava Flow WSAs
- Border Hill NNL

The areas listed below and in Table 79 would be avoided when locating major rights-of-way.

- Mescalero Sands North Dune OHV Area (applies to overhead power and telephone lines)
- Haystack Mountain OHV Area (applies to overhead power and telephone lines)

Cave and Karst Resource Management

Goal: To protect cave values while allowing for limited recreational, commercial and educational use. Research and scientific use would have priority over other uses.

Visitor use limits, seasons of use, and a permit system would be established for all caves where the entrance is on public land and cave resources are being affected by visitor use.

No surface occupancy would be allowed within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Refer to Appendix 3 for more information on this restriction.

Off-Highway Vehicle (OHV) Management

Goal: Manage OHV use to provide adequate access and reduce adverse impacts on sensitive resource values. Provide quality recreational opportunities for OHV users in conjunction with demand and safety concerns.

Inventories, public review, and transportation planning would be conducted to support road-by-road designations for roads and trails suitable for off-highway vehicle use. Proposed designations are listed in Table 87 and shown on Map 14. All roads and trails not otherwise categorized would be designated limited to designated roads and trails for off-highway vehicle use. Pending completion of formal designations, all roads and trails would be managed as limited to existing roads and trails for off-highway vehicle use.

The Mathers RNA (242 acres) would be closed to OHV use, except for two existing roads, which would be classified as limited to designated roads or trails.

Public lands within the present boundaries of the Carrizozo Lava Flow and Little Black Peak WSAs (25,321 acres) would be designated closed to off-highway vehicle use to protect outstanding semi-primitive values. Any state or private lands acquired within the present boundaries of the WSA's would be designated closed to OHV use. Public land and acquired state or private lands adjacent to the WSAs would be designated limited to designated roads and trails for OHV use to provide access and limit impacts to fragile soils and vegetation.

The Mescalero Sands North Dune OHV Area would be enlarged to approximately 1,546 acres, and would be designated open and managed for intensive OHV use, with emphasis on providing a quality play area for OHV's. Approximately 410 acres of private land would be considered for acquisition. Upgrades and development could include interpretive/safety displays with emphasis on the National Tread Lightly Program, sun shelters, rest rooms and potable water. Livestock would be fenced-out from about 20 acres around existing and planned developments.

Approximately 3,500 acres at the Haystack Mountain OHV Area would be managed as an OHV Intensive Use Area and designated limited to designated roads for all-terrain vehicles less than 50 inches in width. An easement about 50 feet by 100 yards in size would be acquired through two state sections to provide access to the northern portion of the OHV area. Non-motorized use of the Haystack Mountain OHV Area would be allowed. Facilities would be considered for development, such as rest rooms, sun shelters, trails, interpretive displays and picnic sites.

Approximately 400 acres in the Valley of Fires Recreation Area would be designated closed to protect the viewshed from the existing campground and nature trail. The remainder of the area, 63 acres in the developed area, would be designated limited to designated roads and trails for off-highway vehicle use for maintenance needs and future campground development.

The Rio Bonito acquired lands (Tracts 1-5) would be designated limited to designated roads and trails for OHV use to protect riparian values.

The 150-acre Border Hills National Natural Landmark would be designated closed to off-highway vehicle use to protect the integrity of the geologic structure.

Approximately 120 acres of the 360 federal acres at the Garnsey Bison Kill site (the core area) would be designated closed to off-highway vehicle use to protect the archaeological and paleontological sites. The remaining 240 federal acres and any acquired lands would be designated limited to designated roads and trails to protect the watershed above the bison kill site. (Refer to the "Cultural and Paleontological Resource Management" section for more discussion of this area.)

Approximately 3,000 acres in the proposed Cocklebur Lakes National Register Archeological District and about 3,400 acres in the proposed Haystack Butte National Register Archeological District would be designated limited to designated roads and trails for off-highway vehicle use.

Following inventory, if it is deemed necessary to protect a significant cave from OHV impacts, a cave exclosure would be constructed and the area within the enclosure would be designated closed to off-highway vehicle use.

A 640-acre OHV area in the Dunahoo Hills northeast of Roswell would be established, if demand warrants, and be designated limited to all-terrain vehicle use.

The 80-acre Billy the Kid Recreation Site would be designated limited to designated roads and trails for OHV use, to protect recreational values.

Approximately 19,200 acres of public lands along both sides of the Pecos River would be designated limited to designated roads and trails for OHVs to protect the floodplain, riparian zone and wetlands.

Approximately 2,000 acres encompassing 56 playas and alkali lakes, and the area within 200 meters of the playas and alkali lakes would be designated closed to off-highway vehicle use.

Approximately 640 acres encompassing the area within 200 meters of the source of about 20 springs or seeps, or within downstream riparian areas created by flows from the source or resulting from riparian area management, would be designated closed to off-highway vehicle use.

The Comanche Hills "B" Area (approximately 883 acres) would be designated closed to OHV use to protect scenic views from U.S. Highway 380 and to reduce the disturbance of waterfowl at the Bitter Lake National Wildlife Refuge.

Wilderness Management

The Little Black Peak and Carrizozo Lava Flow WSAs (25,312 acres) would be managed for roadless recreational opportunities.

If Congress does not designate the WSAs as wilderness, a recommendation would be made to Congress that the Little Black Peak and the Carrizozo Lava Flow areas (not necessarily the WSAs) be designated a National Conservation Area. Trailhead parking areas adjacent to the WSAs and a limited, primitive trail system about two miles in length would be developed to the Little Black Peak cinder cone and to the Lower Windmill area in the southeast corner of Little Black Peak WSA. About three miles of trail from the Valley of Fires Campground to the Malpais Madness Cave would be developed, as well. In each case, legal access would be acquired prior to development of a trail system. Development of these trails would comply with the nonimpairment criteria of the "Interim Management Policy and Guidelines for Lands Under Wilderness Review" and the "Wilderness Management Policy."

Visual Resource Management

Painting would be required of all permanent surface facilities or equipment approved by the BLM. Paint colors would be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. Refer to Appendix 3 for more discussion of this topic.

WATERSHED MANAGEMENT

Soil Management

Goal: Provide benefits and prevent damage to other resources by managing soil resources.

Best Management Practices (BMPs) would be used to minimize sedimentation as a cause of nonpoint source pollution in surface waters. The BMPs, based on standard operating procedures, oil and gas lease stipulations or BLM policy, would be specified in activity plans for actions that make soils more susceptible to erosion, or which impair soil productivity. Full consideration would be given to environmental benefits and economic costs of the BMPs. Activities requiring implementation of BMPs would include, but would not be limited to:

- soil disturbing activities that result in soil loss due to accelerated wind or water erosion;
- activities that reduce vegetative cover, thus exposing the soil to erosion processes, and reducing the amount of soil organic matter and soil productivity;

- activities that tend to concentrate surface runoff or steepen hydraulic gradients, thus increasing soil erosion by flowing water;

- activities that result in sediment loading directly to streams;

- activities that damage soil structure by compaction or other means; and

- activities that degrade the physical, chemical, or biological properties of the soil, such as high-intensity burns, contamination by toxic substances, or other means.

No occupancy or use would be allowed on slopes over 20 percent or fragile soils. Refer to Appendix 3 for more discussion of this restriction.

Surface Water Management: Quantity

Goal: Increase water availability by enhancing annual water yields, instream flows, and discharge from springs, while also reducing resource damage by floods and accelerated erosion.

Strategic watershed management plans would be developed and implemented for watersheds that are susceptible to severe long-term soil losses or gully erosion, and which have a high potential to respond to treatment.

Plans would be developed for the following watersheds susceptible to severe long-term soil loss (i.e. mean annual soil loss over the delineated area is estimated to be 1.0 ac-ft/mi^2/yr or more), shown on Map 41, in Chapter 3:

- Rio Bonito including Salado Creek;
- Pecos River (from confluence of Yeso Creek to Bitter Lake National Wildlife Refuge); and
- the closed drainage area to Nakee Ishee Lakes.

Plans also would be developed for the following watersheds susceptible to severe gully erosion, shown on Map 41, in Chapter 3.

- Rio Bonito including Salado Creek;
- Arroyo del Macho;
- Gallo Arroyo;
- Feliz River.

As part of the watershed management plans prepared for these six watersheds, site-specific prescriptions would be written which could include, but not be limited to, the following practices: (1) mechanical, chemical, or prescribed fire vegetation treatments,; (2) plantings of native riparian plant species and seeding of herbaceous ground cover; (3) livestock grazing management by controlling livestock numbers and season of use, and by providing alternative water and mineral sources; (4) construction of erosion, sediment and flood control structures; (5) use of other methods determined most suitable for site-specific conditions; (6) implementation of a monitoring program, including a feedback loop which would guide management based on monitoring information.

Springs and seeps, playas, and sinkhole lakes on public lands would be developed to improve wetland and riparian habitat, and to increase water availability. Water sources would be prioritized for development based on the following criteria:

- Presence of threatened or endangered species;

- Potential habitat for threatened or endangered species;

- Presence of perennial water or ephemeral water for extended periods;

- Presence of native riparian vegetation;

- Significant ground-water recharge areas;

- Limited alternative water sources in the area for wildlife and livestock;

- Federal ownership of both surface and subsurface estates.

Water source developments could include, but are not limited to:

- Protective exclosures;
- Native riparian plantings;
- Construction of supplemental water pipelines;
- Control of undesirable vegetation; and
- Off-site livestock waters.

Surface Water Management: Quality

Goal: Maintain or improve the quality of surface waters to support all designated uses listed by the New Mexico Water Quality Control Commission (WQCC 91-1, Amendment 1). Water quality would be based on the general and specific stream standards outlined by the WQCC.

Further degradation of water quality would be prevented whenever practicable to meet present or possible future demands, such as domestic or municipal water supplies, irrigation, livestock, wildlife, recreation, aquatic and riparian habitat, and other uses. Exceptions would be considered on a case-by-case basis when water quality standards more stringent than state and federal standards would result in increased economic costs that exceed environmental benefits.

Best Management Practices would be developed in activity plans for actions that degrade surface water quality through nonpoint source pollution. The primary emphasis of BMPs would be on preserving environmental values. Surface water quality parameters that would be addressed in BMPs include, but are not limited to: water temperature, turbidity, sediment transport and yield, chemical loading, and nutrient loading.

Due to "checkerboard" ownership in watersheds, management on BLM-administered lands alone may not be adequate to support designated stream uses. Where appropriate, cooperative agreements, MOUs, or other interagency efforts would be made to manage entire watersheds to maintain or improve water quality.

Groundwater Management

Goal: Maintain or improve groundwater quality to meet applicable state and federal standards.

Further degradation of groundwater quality would be prevented whenever practicable, even when WQCC standards allow for further degradation. Exceptions would be considered for areas specifically exempted by state or federal authority, and on a case-by-case basis when standards more stringent than state and federal standards would result in increased economic costs which exceed environmental benefits.

Best Management Practices would be developed on a case-by-case basis for actions that degrade groundwater quality through nonpoint source pollution, for groundwater with 10,000 mg/l total dissolved solids (TDS) or less. The primary emphasis of BMPs would be on preserving environmental values. Groundwater quality parameters that would be addressed in BMPs include, but are not limited to: TDS, pH, volatile organic compounds, and heavy metals.

For any site proposed for pesticide treatment, the potential for groundwater contamination would be evaluated with the EPA rating system, DRASTIC (Aller et al. 1985). If the site proposed for treatment has a DRASTIC index greater than 100, it has a moderate to high potential for groundwater contamination, and would require a more detailed analysis prior to a decision being made on the proposed treatment. Factors that would be studied further include: pesticide solubility, mobility, speciation, and degradation, and highly localized recharge areas.

Water Rights Management

Goal: Protect existing public land water supplies through federal reserved water rights and State appropriative water rights. Also, acquire and/or perfect water rights necessary to carry out multiple-use management through State law, acquisition, and the adjudication process.

For any proposed action on BLM-administered lands that would require the use of water, or which could affect water supplies elsewhere, the New Mexico State Engineer (SEO) would be contacted to ensure protection of BLM water rights, and to prevent impairment of other users' water rights.

The acquisition or protection of water rights would be prioritized according to the following list (in descending order of importance):

1. Streams or rivers with special designation by Congress.

2. Other streams or rivers.
3. Springs.
4. Wells.
5. Natural water holes, playas, and sinkholes.
6. Reservoirs greater than 10 ac-ft capacity.
7. Reservoirs less than 10 ac-ft capacity.

Water use proposals filed with the SEO by entities other than the BLM that could affect water rights and uses on public lands would be evaluated for their impact on BLM water resources. Actions that would impair the quality of public land resources would be protested through procedures specified by the SEO.

Water rights held by the BLM would be maintained primarily through:

- Beneficial use, and maintenance of manmade diversions, where appropriate. The SEO would be notified of all water uses and relevant public land authorities. Proposals that require the use of BLM-held water would include specific provisions for meeting these requirements, prior to approval by the BLM Authorized Officer.

- Other opportunities, such as MOUs, water marketing, or other coordinated efforts, according to existing law.

One of the last populations of lesser prairie chickens in the U.S. lives in the Roswell and Carlsbad Resource Areas.

WILDLIFE HABITAT MANAGEMENT

Special Status Species Habitat Management

Goal: Provide protection and recovery for all Special Status Species, which are federal and state listed species, and federal candidate species, and their habitats on public lands. Conserve occupied and potential habitat for these species on public land to maintain or enhance populations at levels to avoid listing by either state or federal governments while allowing for mineral production and development.

U.S. Fish and Wildlife Service Recovery Plans would be implemented, including the reintroduction of native special status species in suitable areas on public land in coordination and cooperation with local governments. Current plans cover the American peregrine falcon, SW bald eagle, Pecos gambusia, Kuenzler hedgehog cactus, Pecos bluntnose shiner and Black-footed ferret.

Big Game/Upland Game Habitat Management

Goal: Maintain or improve habitat utilized by big game or upland game to provide sufficient quantity and quality of habitat (food, water, cover, space) necessary for population maintenance and expansion on public land.

Prescribed burns would be conducted in selected pinon-juniper community types at Fort Stanton and the Cedar Hills area west of Roswell. For each prescribed burn the acreage to be burned and the objective of the fire would be tied to wildlife habitat management and desired plant community management objectives described in activity plans.

No surface occupancy would be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects. Refer to Appendix 3 for more information on this restriction.

Big game and upland game transplants or reintroductions on public lands would be conducted when cooperatively prescribed by the BLM and the NMDGF. Projected transplants or reintroductions include, but are not limited to:

- Pronghorn antelope in pastures that meet the suitability criteria (see Appendix 12);
- Mule deer in areas of low population density or in areas to enhance deer herd gene pools;
- Wild turkey at Fort Stanton and on the Rio Bonito acquired lands;
- Other big game or upland game species recommended by the New Mexico Department of Game and Fish.

If opportunities arise, acquisitions of non-federal lands would be considered in the following instances, to improve management of big game. Acquisitions in the Caprock deer management area would benefit special status species and raptor habitat management goals, as well.

- Caprock WHA: 18,969 acres of state land; 8,840 acres of private land
- Cedar Hills and Pecos River deer management areas: 3,521 acres of state land
- Rio Bonito area: 279 acres of state land

Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in lesser prairie chicken habitat during the period of March 1 through June 30, each year. Additionally, no new drilling would be allowed within up to 200 meters of leks known at the time of permitting. Refer to Appendix 3 for more discussion of these restrictions.

Core prairie chicken habitat areas would be avoided when locating major rights-of-way. Refer to Table 79.

Waterfowl Habitat Management

Goal: Perpetuate a diversity and abundance of waterfowl populations in the Central Flyway by protecting and enhancing wetlands, including playa lakes, alkali lakes, sinkhole lakes and earthen tanks, while allowing a level of mineral development and production that would not decrease waterfowl habitat and populations.

Develop as many as 400 acres of wetland habitat in suitable areas within the floodplain of the Pecos River. Suitability criteria include but are not limited to:

- Areas with seasonal surface waters indicative of a high water table or subsurface clay layer;
- Areas with the potential of supporting cottonwood tree groves;
- Areas that have or would receive vegetation manipulation projects (salt cedar control, prescribed fire, riparian pasture development).

No surface occupancy would be allowed within up to 200 meters of active heronries. Refer to Appendix 3 for more discussion on this restriction.

Agricultural practices and moist soil management techniques would be used to enhance yearlong food supplies for wildlife on the lands acquired along the Rio Bonito. These practices may include but are not limited to:

- Share cropping of valuable foods (alfalfa, winter wheat, barley, pasture grasses) with a portion left as a standing crop for wildlife;
- Seasonal flood irrigation;
- Construction of irrigation ponds and wells;
- Construction of boundary and pasture fences;

Livestock grazing on the acquired Rio Bonito lands would be considered during the development of a management plan for the area, to determine if grazing should occur and under what conditions it would be allowed. Grazing preference would not be established and grazing would be used as a tool to accomplish the objectives of the management plan.

Raptor Habitat Management

Goal: Provide suitable raptor habitat conditions on public lands through the conservation and management of essential habitat components, including habitat for prey species while allowing for mineral development and production that would not degrade habitat components.

Nesting, migration, and wintering areas for raptors would be protected or enhanced on about 926,000 acres of public lands in the Macho, Caprock, Fort Stanton and Overflow Wetland wildlife habitat areas, and along the Pecos River.

Management emphasis for protection and enhancement of habitat would be focused on designated Key Raptor Areas and those identified in the future. Management practices could include developing protective exclosures around tree groves and sinkholes, and constructing raptor nesting platforms.

No surface occupancy would be allowed within up to 200 meters of active raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments. Refer to Appendix 3 for more discussion of this topic.

Fisheries and Aquatic Habitat Management

Goal: Protect and enhance aquatic habitat and associated natural diversity and distribution patterns of native nongame and sport fish, invertebrates, and aquatic mammals, while allowing for mineral development and production that would not degrade aquatic habitat.

Construction of streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection would be allowed for the Rio Bonito, Salado Creek and the Pecos River. Criteria for consideration include, but are not limited to, areas that:

- Exhibit streambank sloughing;
- Lack riparian vegetation or regeneration;
- Exhibit invasion of exotic or undesirable plant species;
- Exhibit erosion of side drainages;
- Lack riparian pastures to control livestock use.

Monitor lotic and lentic systems for:

- Compliance with established water quality standards;
- Fish and macroinvertebrate productivity and composition;
- Stream channel substrate condition as it relates to watershed condition;

- Use of water rights, where established.

Native fish and sport fish introductions or transplants would be undertaken in suitable waters located on public land, in coordination with the New Mexico Department of Game and Fish. Proposed introductions include but would not be limited to:

  - Rainbow, cutthroat, brown, and brook trout in the Rio Bonito;

  - Bass and bluegill in irrigation ponds.

Criteria for suitable waters include, but are not limited to:

- Availability of perennial water;

- Presence of existing populations indicative of suitable habitat conditions that may need supplementing due to fishing pressure;

- No or low populations in stream segments with suitable habitat conditions (water flow, temperature, stream shading, pools & riffles, stable streambanks, water quality, substrate condition, invertebrates);

- Channel dimension and capacity.

Riparian/Wetland and Playa Lake Management

Goal: Restore and maintain riparian/wetland areas to achieve proper functioning condition. Allow for mineral development and production that would not degrade or impair the proper functioning condition of riparian habitat. Achieve an advanced ecological status, except where resource management objectives would require an earlier successional stage.

Lands within 200 meters of the source of springs and seeps, and within downstream riparian areas created by flows from the source, or through riparian area management, would be considered for withdrawal from all forms of entry under the public land laws, including the general mining laws. Areas to be withdrawn would be prioritized according to one or more of the following criteria:

- Presence of threatened or endangered species that rely on the source;

- The spring or seep is located in a Special Recreation Management Area;

- The spring or seep is important for maintaining crucial or critical wildlife habitat.

If additional springs or seeps meeting these criteria are identified, they would be prioritized and considered for withdrawal, after processing of the initial list of springs and seeps was completed.

No surface occupancy would be allowed within up to 200 meters of playas and alkali lakes, perennial streams, rivers and floodplains and springs and seeps. Refer to the Surface Use and Occupancy Requirements in Appendix 3 for more discussion on these restrictions.

Springs and seeps, reservoirs, earthen tanks and playa lakes would be enhanced by constructing protective exclosures, planting native vegetation, establishing vegetation for wildlife cover, controlling undesirable vegetation, constructing supplemental water pipelines to specific sites, and providing off-site livestock water.

If opportunities arise, acquisition would be considered for 590 acres of state land and 1,051 acres of private land within or adjacent to playa lakes, and for 1,440 acres of state land and 2,955 acres of private land along the Pecos River. Any acquisitions in these areas would benefit riparian, wetland and playa lake management efforts.

FIRE MANAGEMENT

Goal: Limit damage to natural resources and to life and property caused by wildfire. Wherever possible, restore fire to its natural role in the ecosystem through the use of prescribed fire. Use prescribed fire as a tool for land treatment to replace or augment the use of chemical and mechanical treatments.

Prescribed Fire

Prescribed fires ignited by the BLM, including the re-treatment of acreage previously burned, would be conducted. For each prescribed burn the acreage to be burned and the objective of the fire would accomplish specific land management objectives identified in activity plans by specialists in one or more of the Resource Area's management programs. Prescribed fires generally are tied to vegetation management objectives based on vegetation types, which are: salt cedar; upland grasslands; pinon/juniper invasion areas; and areas of sacaton. Prescribed fire would be used, when possible, to treat vegetation as part of the process of attaining the identified desired plant community for a given area.

Prescribed natural fire would be employed to accomplish land management objectives when the following criteria are met:

- fire planning for the use of prescribed fire has been completed, including establishing burning prescriptions and boundaries of areas to be burned
- ignitions occur in the period February through May
- funding already has been programmed for planned prescribed fires and adequate personnel and equipment are available to achieve defined objectives
- ignitions occur in salt cedar along the Pecos River or other drainages; in juniper at Fort Stanton east of State Highway 214; in areas of sacaton; and in upland grassland communities.

Protection from Wildfire

Resource advisors would be on hand to provide advice on tactics employed during suppression under either the conditional or full fire suppression response levels.

Archeological site data on base maps and in site records would be reviewed to determine the location and significance of cultural resources before using heavy equipment to construct fire line, except where personal safety or property are threatened, or when resource values outweigh cultural values. Wherever possible, an archeologist would monitor the use of heavy equipment to ensure that cultural resources would be avoided.

The protection of wetlands and surrounding habitat for waterfowl and T&E fish in the Overflow Wetlands would be accomplished without the use of bulldozers and other heavy equipment, or chemical fire retardant.

The conditional fire suppression response level would be applied resource area-wide, with the following exceptions, where full suppression would be used.

- Protection of life or property, in any situation.
- Pecos River: Protect important vegetation, such as cottonwoods and willows, in riparian/wetland habitat within the 100-year floodplain. Limited use of machines, such as bulldozers, may be required, based on the advice of a resource advisor. For fires in salt cedar, resources such as bulldozers or chemical fire retardant could be employed to limit the spread of fire to the smallest possible area.
- Caprock WHA: For wildfires occurring in treated pastures in the months of April through January, full suppression would be employed to protect wildlife habitat. In February and March, and depending on the location of the fire relative to previous vegetation treatments, suppression activities may occur at the conditional level and may be limited to monitoring the wildfire.
- Fort Stanton: Protection of the Kuenzler hedgehog cactus, the entrance of Fort Stanton Cave, the Rio Bonito Campground, and screening trees around the campground would be accomplished with full suppression, except that heavy equipment would not be used to construct fire line.
- Playas larger than 20 acres, springs and seeps, other riparian areas: Fire suppression would include protection of these areas from surface disturbance and the effects of chemical fire retardant, by prohibiting the use of engines, heavy equipment and retardant drops in riparian areas.
- Caves and karst areas: Fire suppression in cave and karst areas would include protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of bulldozers and other heavy equipment to

construct fire line within 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features.

- Valley of Fires Recreation Area: Protection of the recreation area would be accomplished without the use of heavy equipment to construct fire line.
- Border Hills Structural Zone National Natural Landmark: The use of heavy equipment to construct fire line within this area would be prohibited.
- Steep slopes: Fire line would not be constructed with bulldozers or other heavy equipment on slopes greater than 20 percent, or greater than 10 percent on fragile soils, except to protect life or property.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The boundaries of the ACECs described below have been established based on the presence of resources and opportunities for efficient management, irrespective of land ownership. The inclusion of other ownerships in ACECs is for purposes of disclosure and does not mean those lands would be designated as part of an ACEC, or that the management proposed in this alternative would be applied to those lands. The acquisition of non-federal lands within ACECs is included in the management proposed in this alternative. If non-federal lands are acquired, those lands could then become part of a designated ACEC and be managed according to the management proposed in this alternative, without additional land use planning.

See Map 15 for the locations of the proposed ACECs. Refer to Appendix 13 for discussions of relevance and importance criteria for Areas of Environmental Concern. Refer to Appendix 14 for maps that display the differences among the alternatives.

Overflow Wetlands ACEC

The Overflow Wetlands ACEC comprises 6,814 surface acres and 3,000 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 2,987 acres
State land, 1,720 acres
Private land, 2,107 acres

Management Goal:

Protect the biological and scenic values of the Overflow Wetlands WHA, which provides critical habitat for T/E fish species and supports a significant riparian/wetland plant community.

Management Prescriptions:

About 700 acres of wetlands, 170 acres of buffer around the wetlands, and 170 acres of escarpment would be protected by applying "no surface occupancy" restrictions to future oil and gas leases. The remainder of public lands in the ACEC would be open to future leasing with subject to the Surface Use and Occupancy Requirements described in Appendix 3.

About 700 acres of wetlands, 170 acres of buffer around the wetlands, and 170 acres of escarpment would be closed to the disposal of salable minerals and to the leasing of solid minerals, and would be withdrawn from entry under the land laws (including the 1872 Mining Law). These actions would reduce disturbance of the wetlands and surrounding habitat for wildlife species dependent on the area either seasonally (wintering waterfowl) or yearlong (T/E fish).

Major rights-of-way would be excluded on about 3,000 acres of public land with the Overflow Wetlands WHA to benefit wildlife species dependent on the area either seasonally (wintering waterfowl) or yearlong (T/E fish).

Legal access (easements) to the Overflow Wetlands would be acquired to resolve conflicts and enhance management in situations where existing roads that originate from county or state roads are interrupted by private or state land inholdings.

The need for acquiring easements would be evaluated on a case-by case basis as land acquisitions may eliminate the need for some easements.

About 1,700 acres of state land and 2,100 acres of private land with riparian/wetland values would be acquired if opportunities arise. Any lands acquired would be managed according to the prescriptions of this alternative.

Public grazing leases or permits affecting about 3,000 acres of public land currently in Allotments 65060, 65062, and 65069 would be adjusted to improve habitat for wintering waterfowl habitat. Adjustments may include changes in stocking rate and seasons of use, such as reducing year-long grazing to grazing between March 1 and June 30. The grazing lease on Allotment 65041 would be cancelled.

Salt cedar treatments would be conducted on public land in selected riparian-wetland areas using prescribed fire, or mechanical or chemical controls.

The Overflow Wetlands ACEC would be developed to showcase one of New Mexico's prime wetland areas. Developments may include nature trails with wooden walkways and observation overlooks, restroom facilities, picnic tables, trash containers, parking areas, bulletin boards, and upgrading existing access roads.

About 700 acres of wetlands, 170 acres of buffer around the wetlands, and 170 acres of escarpment would be designated closed to OHV use. The use of OHVs on about 2,100 acres would be limited to designated roads and trails.

The BLM would recommend to the New Mexico Department of Game and Fish that the wetlands be designated as a "No Minnow Seining Area" to prevent the taking of the Pecos pupfish.

Public fishing opportunities would be considered for development along the Pecos River on public lands in the areas listed below.
Development may include physical access to fishing sites, parking areas, and fence crossings.

T. 12 S., R. 26 E.,
 Section 5: W1/2W1/2
 Section 17: W1/2NE1/4,SE1/4
 Section 20: NE1/4NE1/4NE1/4

Riparian and aquatic habitats would be protected by acquiring water rights, entering into cooperative agreements for management of those habitats, or other methods.

As many as 300 acres of additional riparian/wetland habitat would be developed. Development may include constructing low berms and dikes, seeding or planting native riparian vegetation, and modifying existing channels. Suitability criteria for development include, but are not limited to:

- Areas with seasonal surface waters indicative of a high water table or subsurface clay layer
- Areas with the potential of supporting cottonwood tree groves
- Areas that have been or would be subject to vegetation manipulation (salt cedar control, prescribed fire, riparian pasture development)

Chemical fire retardant and heavy equipment such as bulldozers and road graders would not be used for wildfire suppression.

North Pecos River ACEC

The North Pecos River ACEC comprises 6,400 surface acres and 4,200 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 3,360 acres
State land, 1,160 acres
Private land, 1,880 acres

Management Goal:

Protect the biological and scenic qualities of the Pecos River ACEC, which provides critical habitat for T/E fish species and supports a significant riparian plant community.

Management Prescriptions:

About 2,080 acres of federal minerals would be closed to future oil and gas leasing. About 2,120 acres of federal minerals would be open to future leasing with No Surface Occupancy.

About 4,200 acres of federal minerals would be closed to the disposal of salable minerals and the leasing of solid minerals, and be withdrawn from entry under the land laws (including the 1872 Mining Law), to eliminate surface disturbance along the Pecos River and in surrounding wildlife habitat.

Public lands in the ACEC would be designated right-of-way avoidance areas for major rights-of-way.

Legal access (easements) to the Pecos River ACEC would be acquired to resolve conflicts and enhance management in situations where existing roads that originate from county or state roads are interrupted by private or state land inholdings. The need for acquiring easements would be evaluated on a case-by-case basis as land acquisitions may eliminate the need for some easements.

About 1,160 acres of state land and 1,880 acres of private land with riparian/wetland values would be acquired if opportunities arise. Acquisition of riparian/wetland habitat would be based on the consideration of the criteria in Appendix 8.

Public grazing leases or permits affecting about 3,360 acres of public land would be adjusted to improve riparian habitat. Adjustments may include changes in seasons of use and stocking rates. Grazing practices would be modified on lands within the ACEC that are currently in Allotments 64038, 64039, 64538, and 65001.

Salt cedar control would be conducted on about 600 acres of public land in selected riparian-wetland areas, using prescribed fire, or mechanical or chemical controls.

The use of OHVs would be limited to designated roads and trails on about 3,360 acres.

The BLM would recommend to the New Mexico Department of Game and Fish the designation of the wetlands as a "No Minnow Seining Area," to prevent the taking of the Pecos bluntnose shiner.

Mescalero Sands ACEC

The Mescalero Sands ACEC comprises 10,007 surface acres and 7,931 acres of federal mineral estate. The surface acreage consists of the following categories and acreages:

Public land, 7,888 acres
State land, 1,799 acres
Private land, 320 acres

Management Goal:

Protect the biological, archaeological and scenic qualities of the Mescalero Sands ACEC, with emphasis on the preservation of a portion of the shinnery oak-dune community to enhance the biodiversity of the ecosystem.

Management Prescriptions:

The entire federal mineral estate in the ACEC would be closed to future oil and gas leasing.

The entire federal mineral estate in the ACEC would be proposed for withdrawal from entry under the public land laws, including the 1872 Mining Law. The ACEC would also be closed to solid mineral leasing and the disposal of salable minerals.

Major rights-of-way would be excluded from the ACEC to protect active dunes and surrounding habitat.

Legal access to the ACEC, especially from the east and across state lands would be acquired, as needed, to resolve conflicts and enhance management. Easement acquisitions would be evaluated on a case-by-case basis since the potential acquisition of land may eliminate the need for easements.

As many as 1,800 acres of state and 320 acres of private lands in the ACEC would be considered for acquisition if opportunities arise. Any land acquired would be managed according to the management prescriptions in this alternative.

The present 1,838-acre grazing exclusion area would be enlarged by about 640 acres by realigning existing fences, to facilitate maintenance and to improve management of the area. On parts of the ACEC where livestock grazing would continue, no increase in grazing preference on public lands would be permitted. No additional range improvements or vegetation treatments geared toward livestock production would be permitted in the ACEC. Projects designed for resource enhancement or protection would be considered.

The existing National Natural Landmark designation on 3,208 acres of federal, state and private land and the existing Outstanding Natural Area designation on 6,173 acres of federal land would be retained. Each of these areas is totally encompassed by the ACEC.

The 2,478-acre grazing exclusion area would be designated closed to the use of OHVs. In the remainder of the ACEC, OHV use would be limited to designated roads and trails.

Fort Stanton ACEC

The Fort Stanton ACEC comprises 24,630 surface acres and 27,622 acres of federal mineral estate. The state-owned hospital and prison and the Sierra Blanca Airport within the boundary of the ACEC are not included in the acreage of the ACEC.

Management Goal:

Protect the biological, archaeological and scenic qualities of Fort Stanton, while providing for quality recreation opportunity.

Management Prescriptions:

All public lands in Fort Stanton would be open to saleable mineral disposal, except for approximately 330 acres in the Feather Cave Archeological Complex. All public lands in Fort Stanton would remain withdrawn from the general mining laws, and closed to the disposal of leasable minerals and to the leasing of oil and gas.

Major rights-of-way would be excluded on about 24,630 acres of public land to protect important plant and animal habitat, significant riparian, wetland and aquatic habitats, and visual quality.

As many as 1,480 acres of private and state lands adjacent to Fort Stanton would be acquired if opportunities arise. Any acquired lands would be managed according to the prescriptions of this alternative.

A BLM administrative site would not be developed at Fort Stanton unless the BLM acquires the existing facilities previously used by New Mexico State University.

Livestock grazing would be considered to the extent it would be used as a tool to accomplish management plan objectives. Livestock grazing would be excluded from the Feather Cave Archeological Complex. No grazing preference would be established.

Salt cedar treatments would be conducted on as many as 300 acres of selected riparian/wetland habitat along the Rio Bonito and Salado Creek using prescribed fire, mechanical control (chain saws), or chemicals.

Prescribed burns would be conducted in selected pinon-juniper, riparian and grassland community types at Fort Stanton to improve wildlife habitat and reduce fuels. Fuelwood sales would be permitted in selected areas.

Two overlooks would be considered for development on the north and south sides of the historical Fort to interpret the history of the Fort's structures and area, in conjunction with the Boots and Saddles initiative.

Approximately 330 acres around the Lower Stanton Ruin and Feather Cave would be managed to preserve, protect and interpret unique archeological values, artifacts and architectural features. The area would be called the Feather Cave Archeological Complex. In addition to the management prescribed for the Fort Stanton ACEC that would also apply to the Archeological Complex, the following specific management actions would be applied, as well:

- recreation development would be considered, such as trails to Lower Stanton ruin and Indian Shelter Cave, signs, an interpretive shelter, rest rooms, and a parking area;
- off-site and on-site interpretation would be considered, including site stabilization for interpretive enhancement, exhibits, and signing and brochures.

Fort Stanton would be designated a Special Recreation Management Area with emphasis on providing quality recreational opportunities subordinate to the management of riparian and wildlife resources.

Recreation facilities such as toilets, tables, and fire rings at the Rio Bonito and Fort Stanton Cave campgrounds would continue to be maintained and upgraded.

In addition to the 40 miles of multi-use trails already in use, about 45 miles of existing roads or trails and about 20 miles of new trails would be developed and maintained as multi-use trails for hiking, horseback riding and mountain bikes. These trails, comprising about 51 acres, would be closed to the use of OHVs.

Camping at Fort Stanton would be managed by:

- Limiting vehicle camping (driving motorized vehicles to a campsite) to the Rio Bonito and Fort Stanton Cave campgrounds and any other designated campsites. But, in no case would camping be allowed within 100 feet of the Rio Bonito and Salado Creek. About 250 acres would be closed to the use of OHVs in these areas.

- Permitting back country camping throughout Fort Stanton, except within 100 feet of the Rio Bonito and Salado Creek and no closer than 300 feet from wildlife and livestock waters, seeps or springs.

- Limiting all camping to no closer than one-quarter mile from waysides, overlooks, interpretive trails or state highways, except at developed campgrounds and designated campsites.

Approximately 24,000 acres would be designated as limited to designated roads and trails for OHV use, to protect soils, cultural resources, and vegetation, including threatened or endangered species.

A wayside stop would be considered for development along U.S. Highway 380 to interpret the historical, archaeological, and recreational opportunities of the area.

The use of OHVs would be limited to designated roads and trails, with the following exceptions:

- A 100-foot wide corridor measured from the edge of the creek along each side of the Rio Bonito and Salado Creek would be closed to OHV use to protect sensitive riparian resources, except for the use of designated roads within the corridor.

- All multi-use trails (horse, hiking and mountain biking) would be closed to OHV use. Mountain bike trails that are located on existing roads would be open for OHV use.

- The Feather Cave Archeological Complex would be closed to OHV use, except for U.S. Highway 380 and the Fort Stanton Cave Road.

Streambank stabilization structures, native riparian plantings, riparian pastures, salt cedar control, and spring and drainage protection measures could be implemented on the Rio Bonito and Salado Creek. These practices would be used in situations including, but not limited to, areas that:

- Exhibit streambank sloughing;

- Lack riparian vegetation or regeneration;

- Exhibit invasion of exotics or undesirable plant species;

- Exhibit erosion of side drainages;

- Lack riparian pastures to control livestock use.

Riparian and aquatic habitat would be protected by maintaining minimum acceptable instream flow for Rio Bonito Creek at Fort Stanton by acquiring water rights, entering into cooperative management agreements, or other methods.

Big game or upland game transplants and reintroductions would be conducted on public lands when cooperatively prescribed by the BLM and the NMDGF. Transplants and reintroductions include, but are not limited to:

- Pronghorn antelope in pastures that meet the suitability criteria (see Appendix 12);

- Mule deer in areas of low population density or areas to enhance gene pools;

- Wild turkey;
- Other big game or upland game species recommended by the New Mexico Department of Game and Fish.

Native fish and sport fish introductions or transplants would be conducted in suitable waters on public land in coordination with the New Mexico Department of Game and Fish. Proposed introductions could include rainbow, cutthroat, brown, and brook trout in Rio Bonito Creek. Criteria for introductions or transplants include, but are not limited to:

- Perennial water availability;
- Existing populations indicate suitable habitat conditions but may need supplementing due to fishing pressure;
- No or low populations in stream segments with suitable habitat conditions such as water flow, temperature, stream shading, pools & riffles, and stable streambanks.

The full wildfire suppression response level would be applied at Fort Stanton to protect Kuenzler cactus habitat, the entrance to Fort Stanton Cave, the Rio Bonito Campground and screening trees around the campground. Bulldozers would not be used to construct fire line.

Roswell Cave Complex ACEC

The Roswell Cave Complex ACEC consists of nine cave systems. The nine cave systems comprising the Roswell Cave Complex are: Angora-Corn Cave; Bat Hole Cave; Coachwhip Cave; Crockett Cave; Crystal Caverns-Devils Well Caves; Martin-Antelope Gyp Cave; Millrace Cave; Torgac Cave; and Zia Christine Cave. The ACEC comprises 16,818 surface acres. There are 14,894 acres of federal mineral estate in the ACEC, including 3,000 acres under private surface. The surface acreage consists of the following categories and acreages:

Public land, 11,894 acres
Private land, 4,920 acres

Refer to Table 41 for the categories and acreages of lands comprising the ACEC, listed by cave system.

Management Goal:

Protect the natural and scenic values of caves, while allowing for limited recreational, commercial, scientific and educational use.

Management Prescriptions:

The federal mineral estate in the ACEC, nearly 15,000 acres in size, would be closed to future leasing of oil and gas, the disposal of saleable minerals, and the leasing of solid minerals. The federal mineral estate would also be proposed for withdrawal from entry under the general land laws, including the 1872 Mining Law.

All lands in the ACEC would be designated exclusion areas for major rights-of-way.

The BLM would acquire access easements to caves for which legal access does not exist. The need for acquiring easements would be evaluated on a case-by-case basis as land acquisitions my eliminate the need for some easements. The cave systems to which access would be acquired are:

- Crockett Cave, 1.25 miles
- Crystal Caverns-Devils Well caves, 2.2 miles
- Millrace Cave, .33 mile

All public land in the ACEC would be retained. About 4,920 acres of private land would be acquired if opportunities arise to protect the caves and their hydrologic processes. Any lands acquired would be managed according to the prescriptions in this alternative.

Fenced exclosures would be constructed around cave entrances when necessary to control access or reduce impacts to cave resources.

No livestock would be allowed within any cave exclosure. Grazing would be excluded on as many as 1,000 surface acres in the ACEC following the construction of exclosures.

The ACEC would be managed to maintain the cave systems in their natural condition. Management would include actions such as graffiti and trash removal, protection against vandalism, and limiting the extent and location of trails, where appropriate.

Research and scientific use would have priority over other uses. These uses would be curtailed if there is a conflict with the protection of unique cave values.

Bat Hole Cave would be closed to all visitor use, except for administrative or research purposes, to protect the significant bat hibernacula and to protect visitors from extreme safety hazards associated with breakdown and vertical entrances. Coachwhip Cave, a typical gypsum cave, would be closed to all visitor use and managed as a control cave for future research and management programs.

Commercial cave guiding would not be allowed in caves of the ACEC until a comprehensive inventory of the biota and natural resources is accomplished. If surveys determine that these resources would not be affected by limited commercial use, then commercial use would be considered and use limits established consistent with management of the caves.

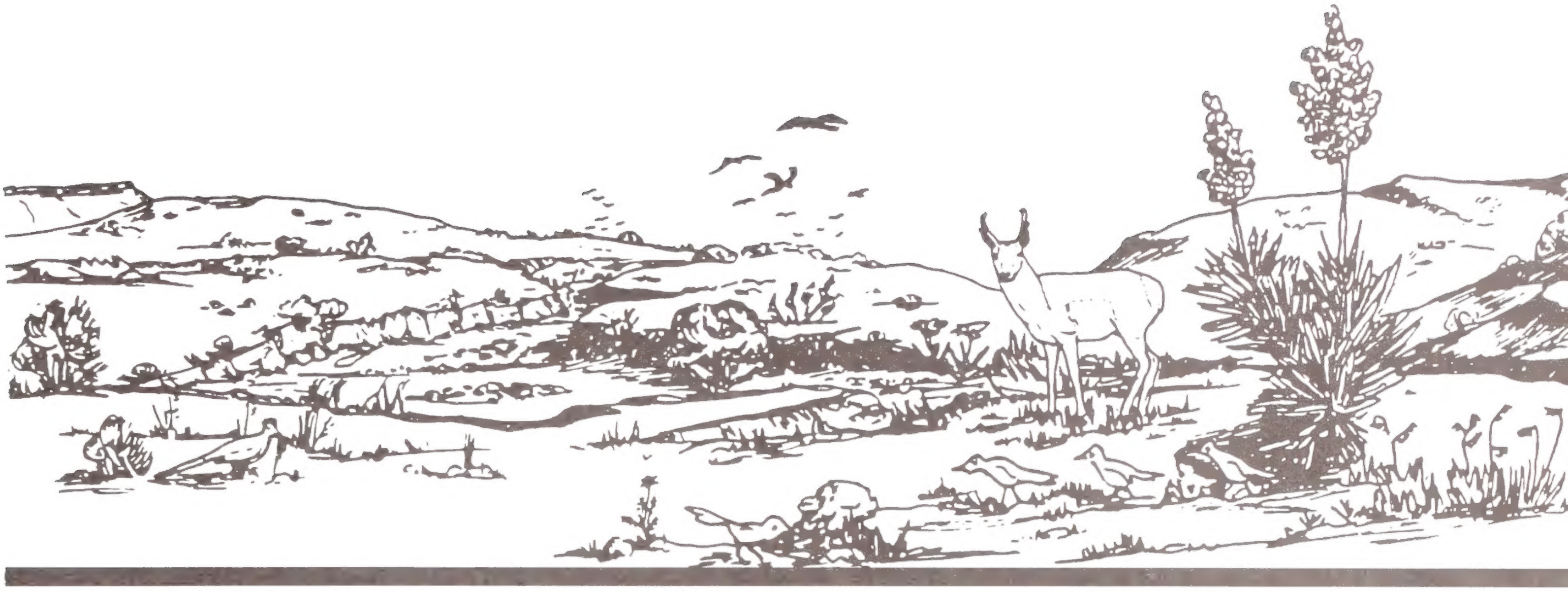
Visitation limits (human carrying capacity) and special stipulations would be prescribed in cave management plans.

Caves in the ACEC with unique or outstanding values, or threatened or endangered species, could warrant development and implementation of additional controls or gating. Documentation of use in all caves in the ACEC would be accomplished by permitting or the installation of cave registers.

About 500 acres of public lands in the ACEC would be designated closed to OHV use, not including lands already closed because they are within a wilderness study area. On the remainder of the public lands, OHV use would be limited to designated roads and trails. The OHV restrictions are displayed by cave, in Table 42.

With the exception of carbide in carbide lamps (miners' lamps), battery acid in flashlights and headlamps, and the temporary use of cave gate construction materials, no solid, liquid, or gaseous substances hazardous to human and animal life would be allowed within any cave or cave exclosure.

Wildfire suppression in the ACEC would include the protection of caves, cave resources and karst features from surface disturbance by prohibiting the use of heavy equipment to construct fire line within 400 meters of known cave entrances, passages or aspects of caves, or significant karst features, or within the exclosures around caves.



CHAPTER 3 AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes those physical, biological, social and economic characteristics of the Roswell District that influence the resolution of planning issues or that affect or are affected by the alternatives described in Chapter 2. This description of the affected environment serves as a baseline for analyzing and determining the effects on resources from various alternatives. The information in this chapter is a summary of more detailed material contained in the Management Situation Analyses (MSA) for the Roswell and Carlsbad resource areas. Each resource area's MSA is available for review at that office.

In this chapter, oil and gas resources and socio-economic factors are discussed in the context of the Roswell District. Because the oil and gas resources of both the Carlsbad and Roswell resource areas are similar, separate discussions would be redundant. Socio-economic factors are generally discussed in the District context to permit assessment within the southeast New Mexico regional economy. Socio-economic factors specific to the Roswell Resource Area are discussed in the Roswell Resource Area section. After the oil and gas resources and socio-economic discussions, the description of the Carlsbad Resource Area's affected environment is displayed first, followed by that of the Roswell Resource Area. The affected environment for the Carlsbad Resource Area discusses only those values and resources affected by oil and gas activities. The affected environment for the Roswell Resource Area discusses values and resources affected by a full range of activities.

OIL AND GAS RESOURCES (ROSWELL DISTRICT)

The oil and gas industry is well established in the Roswell District, with producing oil and gas fields, support services, refineries, and gas compressor stations. All phases of oil and gas activities have occurred in the planning area (i.e., seismic exploration, exploratory drilling, field development and production, and oil refining).

The Roswell District has an estimated area of 20.35 million acres including an estimated 14 million acres of federal mineral estate. As of April 30, 1991, there were 7,726 Federal leases in effect encompassing approximately 3.9 million acres. Of these leases, 2,216, totalling approximately 1.2 million acres, were held by production, while 120 leases, encompassing about 45,633 acres, were held in suspension for various reasons.

Although there are nine counties in the Roswell District, most of the oil and gas production occurs in Lea, Eddy, Chaves, and Roosevelt counties. There are an estimated 729 active oil pools and 486 active gas pools in the Roswell District. The total number of active and abandoned oil and gas pools is

TABLE 88
FEDERAL, STATE AND FEE WELLS DRILLED IN THE ROSWELL DISTRICT (1904-1991)

Resource Area/ County	No. of Wells	Percent
Lea County	23,046	54
Eddy County	12,656	29
Chaves County	5,150	12
Roosevelt County	1,538	4
Other Counties	421	1
Curry		
DeBaca		
Guadalupe		
Lincoln		
Quay		
Carlsbad RA	35,702	83
Roswell RA	7,109	17
Roswell District	42,811	100

Source: BLM files, 1994.

estimated at 1,975 and the total number of wells drilled is estimated at 43,500. Table 88 shows the numbers of wells drilled in the Roswell District 1904-1991). The total number of active wells has been estimated at 27,588 as of January 1993.

In 1992, a total of 783 Applications for Permit to Drill (APDs) federal and non-federal wells were submitted for lands in the Roswell District. The oil and gas production for the same year from the Roswell District has been estimated at 62.5 million barrels of oil and 474 billion cubic feet of gas from about 23,000 oil wells and 4,000 gas wells respectively (60 million barrels of oil and 432 million MCF gas from the Carlsbad Resource Area; 2 million barrels of oil and 42 million MCF gas from the Roswell Resource Area). This is equivalent to about 92 percent of the total oil production and 48 percent of the total gas production from the state of New Mexico. The State ranks fourth among all states in the production of natural gas and fifth in production of petroleum products. However, oil production is declining as the reserves are being depleted.

In 1990, the average oil production was seven barrels of oil per day per well. This low level of production is possible because many reservoirs in this region are relatively shallow and production costs are less than those for deeper wells. In addition, most oil is produced by independent operators who have lower overhead and operating costs than major oil companies. Thus, the independents are able to produce these wells at a lower production rate and smaller profit margin. However, as production rates continue to decline, more and more of these wells will become uneconomic and require plugging.

As of January, 1991, there were approximately 27,000 total active, unreclaimed well sites on federal, state, and private lands in the Roswell District. Each of these sites currently has an estimated five acres of surface disturbance.

The drilling and production of oil exploration and development wells targeted to the present producing formations should continue in southeastern New Mexico fields. As the average daily production declines to a level where it is no longer possible to produce oil and gas at a profit, the number of wells plugged is expected to increase. In addition to plugging, some existing plugged wells are likely to be re-entered and deepened with expectations of encountering hydrocarbons in deeper sedimentary horizons. Little exploration of these older horizons has occurred to date, but hydrocarbons in older, deeper, Devonian age sediments, have been discovered and produced. The extent to which the deeper zones will add to new production in this area is unknown. According to the Energy, Minerals and Natural Resources Department of the State of New Mexico (1991), in 1990, Lea County produced 67.1 percent of the total oil production the State. Eddy County produced 21.1 percent, Roosevelt County produced 1.8 percent, and Chaves County produced 1.6 percent. Production is primarily from the Permian Basin, which extends in the subsurface into Texas.

In the last two decades, the number of gas wells drilled in the Roswell District has increased until gas wells are as numerous as oil wells. In any given year, half the producing wells in the State are gas wells. The average wellhead price for natural gas followed the price increases of the early 1980s following the Iranian oil embargo of 1979 and the Natural Gas Policy Act of 1978. But, increased oil production by OPEC and the general slowdown of the U.S. market lowered the demand and price for natural gas. The actual production of natural gas in the Roswell District is slightly more than half the potential capacity of known reserves. According to the State of New Mexico (1991, p. 133), in 1990, Lea County produced 25.1 percent (245.9 Billion Cubic Feet (BCF)), Eddy County produced 19.0 percent (186.4 BCF), Chaves County produced 3.9 percent (37.9 BCF), and Roosevelt County produced 0.4 percent (3.8 BCF) of the total production for the state of New Mexico. The gas industry is mature, with recovery and separation facilities, and pipelines for transportation in place and potential markets identified. For the near future, the outlook for natural gas is more optimistic than for oil. There is a capability for increased production when market demand increases.

In the future, it can be expected that the price of oil and gas will rise, but when and by how much cannot be predicted with any certainty due to the influence of overseas markets. Some incentives have been provided to industry to drill new wells, work-over existing ones, and to initiate additional secondary or tertiary recovery projects to achieve greater production. Environmental concerns should also increase the demands for natural gas because it is a much cleaner burning fuel than oil. The future of compressed natural gas as a fuel for vehicles could also enhance this picture. Based on past activities, it is reasonable to expect at least one cycle of increased drilling activity over the next decade. Several new oil and gas fields may be developed, and expansion and further development of existing fields is anticipated. Future exploration and development does not necessarily mean an increase in the number of producing wells. The BLM can expect approximately 1,824 wells to be plugged and abandoned over the next 20 years.

Recent economic conditions in the oil industry resulted in a sharp decline in the number of active exploratory wells and the number of development wells. An economic turnaround in the oil industry or an increase in the price of oil purchased from abroad would spur an increase in oil and gas activity in the planning area. Continued low oil prices and depressed economic conditions would result in an increase in the number of abandonments and a decrease in domestic exploration and development.

The U.S. is presently importing about 54 percent of its crude oil needs, with the amount of imports on the increase. Criticism over the failure of the U.S. to develop its domestic crude oil and natural gas reserves is being heard more and more frequently. Indications are that the future demand for oil and gas resources in the Roswell District will increase. The capability of the resource to meet future demand depends upon the presence of undiscovered oil and gas resources, the life expectancy of existing productive areas, and the economic situation, with economics being the bottom line that drives oil and gas activities in the "oil patch." As known productive areas are depleted over time and abandoned, undiscovered resources must meet the continued demand.

Most of the district has high or moderate potential for the occurrence of oil and gas. The high potential areas are those areas now producing oil and gas or which have high industry interest. Moderate potential areas are those areas which have had oil and gas shows in favorable geologic environments (geology similar to high potential areas). Low potential areas are those areas where the geologic environment is unfavorable or where little or no information is available. Map 25 depicts the hydrocarbon potential categories for the Roswell District. The data on which this map is based includes USGS-defined oil and gas plays, published geologic reports and a review of the BLM's individual well records. Table 4 in Chapter 1 shows the BLM-managed mineral estate acreage. For a description of oil and gas operations, see Appendix 15.

SOCIO-ECONOMICS FACTORS (ROSWELL DISTRICT)

The 1990 population of the Roswell District was estimated at 250,580 (Peach and Williams, 1994, as reported in the *Roswell Daily Record*, July 17, 1994). The population density varies from 1 person per square mile in DeBaca County to 30 persons per square mile in Curry County. The counties with the lowest density, generally lower than the district average of 7.9, tend to be rural in character, and the denser counties tend to have greater urban populations concentrated in cities. The socioeconomic characteristics for each county are dependent on the relative population density and the urban/rural proportions for the total county populations.

According to the NMSU Cooperative Extension Service (Peach and Williams), Chaves, Lea, Lincoln, Quay and Roosevelt counties are expected to gain population in the decade between 1990 and 2000. The other four counties are projected to loose population. Chaves County will have the largest gain, 13.66 percent, followed by Roosevelt County with a 9.38 percent gain and Lincoln County with a 7.57 percent gain. The largest loss of population is predicted to occur in De Baca county, where population will drop by 8.79 percent and in Guadalupe County with a drop of 6.79 percent. Changes in the remaining counties will be relatively small.

In the decade between 2000 to 2010, the Extension Service predicts population gains in Chaves (up 13.86 percent), Lea (up 3.15 percent), Lincoln (an increase of 5.91 percent), and Roosevelt counties (up 9.76 percent). Major decreases in population are predicted for De Baca (down 9.35 percent), Eddy (down 2.36 percent), and Guadalupe counties (down 9.16 percent). Changes in the remaining counties would be relatively small.

According to the Rand-McNally Commercial Atlas and Marketing Guide (1984, 115th ed.), the commercial and marketing centers are Roswell, Clovis, Hobbs, Carlsbad, and Artesia. Each city is a hub for transportation including air, rail, and highways, and each is a center for banking and manufacturing. The education system supports primary education through universities with branches of Eastern New Mexico State University at Portales and Roswell, and New Mexico State University at Carlsbad. These five cities and their suburbs contain about 71 percent of the four-county population and they represent 56 percent of the population of the district.

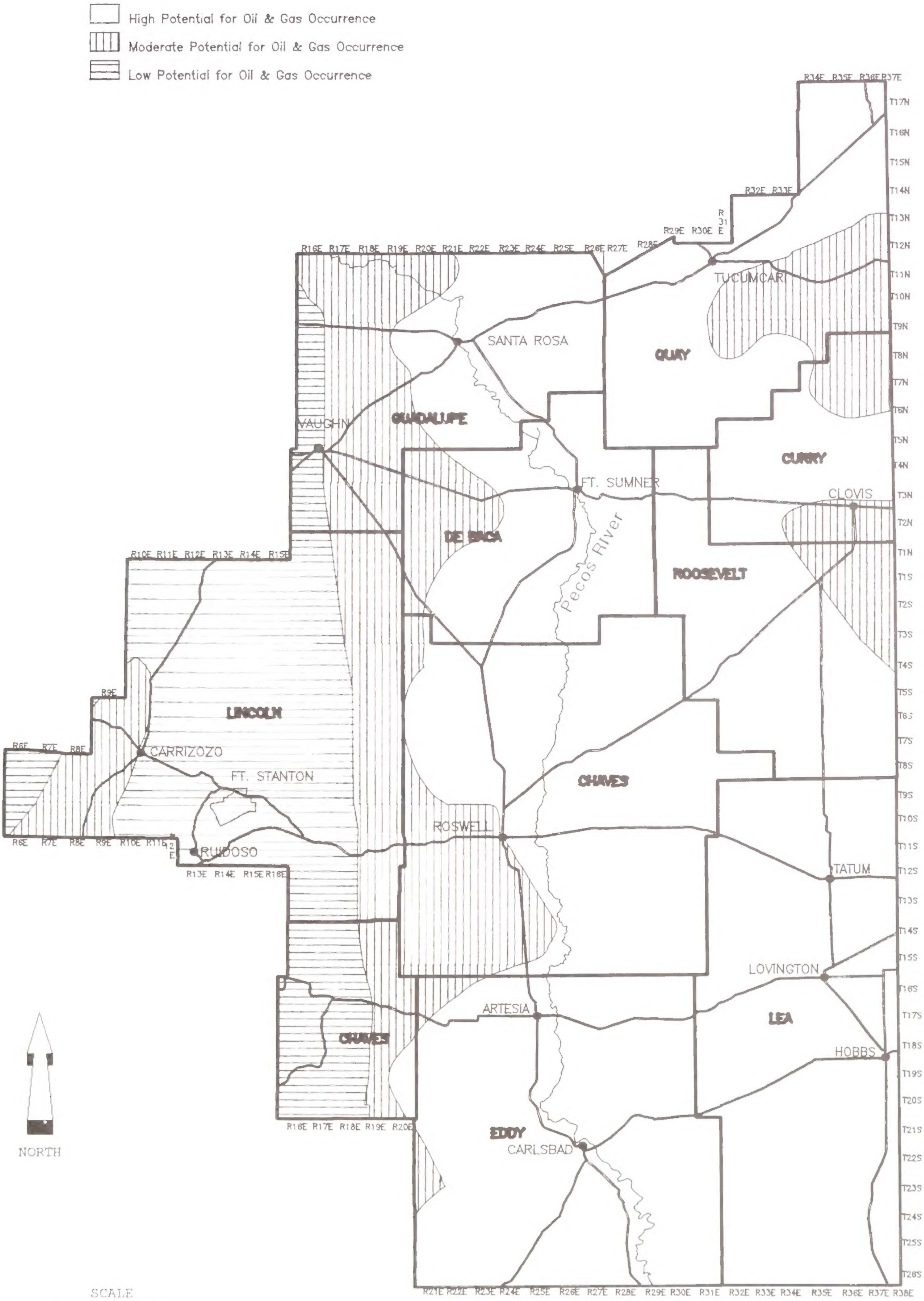
External markets are located about 200 miles away at El Paso and Lubbock in Texas and Albuquerque and Las Cruces New Mexico. The district is centrally located in the nine states of the Southwestern United States.

ROSWELL DISTRICT EMPLOYMENT PROFILE

The non-agricultural sector employs about 81,150 or about 14 percent of the total employed in the state, while the agricultural sector employs about 4,310 or about 17 percent of the total employed in the state. The mining sector employs 8,208 or 53 percent of the total employment in the state. The transportation, communications, and utility sector employs 5,777 or about 20 percent of the total employed in the state.

The average unemployment rate for the district of 6.9 percent, with the low of 4.4 percent for Roosevelt County and the high of 12.7 percent in Guadalupe County. The per capita annual average income within the district ranges between $8,809 in Guadalupe County and the maximum in Chaves County of $12,620.

The average farm size for the district is 3,903 acres and is a measure of the significance of agriculture with DeBaca County leading at 6,789 acres and Curry lagging at 1,503 acres. The average farm size is one measure of the economic assets held by the



SCALE
1/2" = 15.8 Miles
BLM-Roswell District, 1994

MAP 25
OIL and GAS POTENTIAL OCCURRENCE ZONES
Roswell District

Agriculture sector. In 1987, real estate was 72.3 percent of the total assets of the farm sector of the national economy; livestock and poultry was 6.4 percent; and crops under 2.0 percent (Office of the President, 1992). Historical land development, urbanization, and available arable land affect the distribution of farming lands.

ROSWELL DISTRICT ECONOMIC PROFILE

The retail trade sector leads with 33.9 percent of gross receipts; followed by services at 16.3 percent, transportation, communications, and utilities at 14.2 percent; wholesale trade at 11.2 percent; and all other sectors less than 10 percent each with the government sector reported the least at 0.07 percent.

In 1991, the agricultural cash receipts ranged from about 17.1 million dollars for Guadalupe County to about 123.7 million dollars for Chaves County. In Roosevelt County, there is almost an even split between livestock and crops cash receipts. For livestock, including cattle, sheep, and goats, Chaves County reported the largest receipts at about $89 million and DeBaca the least at about $16 million. For crops, including cotton, alfalfa and chilies, Curry County reported the largest receipts at about $36.8 million and Guadalupe County the least at about $562,000.

REVENUE GENERATED FROM FEDERAL MINERAL LEASING

Federal mineral leases generate revenues in all of the counties of the district. Leasing and production generates revenues through bonuses from private companies to acquire leases, rentals based on the included acreage, and royalties returned to the Federal Treasury through the Department of the Interior, Minerals Management Service, based on the gross sales of mineral commodities. All of this revenue is shared with the State on a percentage basis (50 percent on Public Domain lands) less an administration charge.

In fiscal year 1991, leasing of federal minerals generated about $125 million. Oil leasing generated $68.3 million, gas leasing generated $38.1 million, bonuses and rentals generated $14.1 million, solid minerals generated $4.4 million and carbon dioxide generated $45 thousand. The Carlsbad Resource Area reported over $116 million and the Roswell RA reported less than $9 million or 7 percent of the total. Eddy County led all other counties of the district with $63.9 million; Lea County was next with $52.4 million; Chaves County was third with $6.4 million; Roosevelt County with $2.1 million generated; and all other counties with less than 1 percent each. New Mexico State treasury received approximately $58.1 million as its share of the revenues.

CARLSBAD RESOURCE AREA

INTRODUCTION

Environmental components in the Carlsbad Resource Area that would not be affected or that are not important to the resolution of planning issues or analysis of alternatives are not discussed in detail. The following critical elements have been reviewed and determined not to be affected by the actions analyzed in the resource management plan amendment: air quality, Areas of Critical Environmental Concern, prime or unique farmlands, hazardous or solid wastes, Native American religious concerns and Wild and Scenic Rivers.

MINERAL RESOURCES

LEASABLE MINERALS

Oil and Gas

Oil and gas resources in the Carlsbad Resource Area are discussed at the beginning of this chapter.

NON-ENERGY LEASABLE MINERALS

Potash

Potash minerals are used to produce one of the major ingredients (potassium) in fertilizers. There are twelve potash ore zones of Permian Age in the Carlsbad Mining District, all in the Salado formation.

Six of the ore zones have been mined. The first ore zone, located at around 900-1,000 feet below surface, has been the principal source of potash in the Carlsbad Mining District but is now in decline. The third ore zone, found at around 870 feet, has been in production in the northwest part of the potash district since 1976. The fourth ore zone, found at around 850 feet, is rich in langbeinite in the southern part of the district. This zone may be an important source of langbeinite potash in the future. The fifth ore zone, at 800 feet, is mostly langbeinite with occasional sylvite and is found in the central part of the district. The seventh ore zone, found at around 790 feet, is a sylvite zone important mainly in the central part of the district. The tenth ore zone, found from 750 to 1,700, is (after the first zone) the most consistent ore zone in grade, thickness, and extent. This zone represents the remaining major sylvite reserves in the basin. Detailed descriptions of the ore zones can be found in the *Generalized Columnar Section and Radioactivity Log, Carlsbad Potash District* by C. L. Jones, C. G. Bowles, and A. E. Disbrow (1954).

There are five companies mining and refining potash in the resource area. They are Eddy Potash, IMC-Fertilizer, Western Ag Minerals, New Mexico Potash, and Mississippi Chemical Corporation. Horizon Potash discontinued operations in April of 1993. However, during the same year, IMC and Mississippi Chemical expanded operations to increase production. In 1992, the six potash companies in the resource area produced 84 percent of the potash produced in the United States. During 1992, 18.2 million tons of potash ore was mined at an average grade of 13.5 percent K_2O sylvite/langbeinite. Approximately 3.1 million tons of potash was sold for a total value of $242 million, resulting in a production royalty of $5.1 million.

At the present time, there are no active potash prospecting permits in the resource area. Potash leases issued in the resource area include about 165,860 acres.

SALABLE MINERALS

The Carlsbad Resource Area has abundant deposits of limestone, dolomite, sand, gravel, and caliche. The quality of stone and aggregate is variable throughout the resource area. Detailed discussions and maps of aggregate resources are described in *Geology and Aggregate Resources District II, New Mexico State Highway Department* (1972).

Various limestone and dolomite formations through southwestern Eddy and Chaves County offer an abundant supply of quarry rock. The San Andres and Capitan limestones are probably the most desirable formations. However, the quality of rock in the Tansill, Yates, Seven Rivers, and Grayburg formations is equally as good in the immediate back-reef zone.

The stream system west of the Pecos has a generous supply of limestone gravel. The Pecos River area south of Carlsbad contains gravel. The Blackdom and Orchard Park surfaces have slightly higher quantities of quartzose pebbles, but usually the gravels are predominantly limestone. Usable gravel deposits may be found along the margins of the Pecos River floodplain near the confluences of old tributaries and the river channel. Known usable gravel deposits in Lea County are limited to small deposits east of Eunice and north of Tatum.

Caliche is a valuable construction material in many arid and semiarid areas. Deposits of caliche are frequently used for the construction of pads for oil wells, and for surfacing dirt roads. In parts of the Southwest, rainfall is insufficient to dissolve and rapidly carry away the caliche particles. During each rainfall, therefore, the caliche will be partially dissolved, only to reprecipitate into a hard, well consolidated mass after the water has evaporated.

Caliche, as the term is used in the Southwestern United States, refers to a buff, white, or reddish brown calcareous material of secondary accumulation, commonly found in layers on or near the surface of stony soils in arid and semiarid regions, but also occurring as a subsoil deposit in subhumid climates. "Calcrete," "duricrust," and "hardpan" are other terms used to describe caliche in its various forms. Caliche can occur in a variety of forms, ranging from accumulations of dust, to encrustation on rocks, to layers of solid rock.

Caliche deposits are widespread in Eddy County, both east and west of the Pecos River. There are four generations of caliche development in Eddy County associated with the following geomorphic surfaces, oldest to youngest: Llano Estacado (High Plains), Mescalero-Diamond A, Blackdom, and Orchard Park.

The Llano Estacado surface has the best developed caliche profile in Eddy County and occurs primarily in the eastern half of Eddy County. Caliche from the Mescalero surface is not well distributed and is usually of poor quality as a road building aggregate. There are few known usable deposits of caliche on the Diamond A surface. It is primarily a bedrock surface, and caliche deposits occur as a thin, laminated sheet over limestone and as a brecciated, nodular slope cover on limestone hills.

The Blackdom and Orchard Park geomorphic surfaces crop out in most of the cave withdrawal areas discussed in this chapter. The Blackdom and Orchard Park surfaces are suitable for road building aggregate. Even though the indurated zone of caliche is thinner than that of the Llano Estacado, laboratory tests show that it is similar in quality. Pit sites on these surfaces are normally developed for the gravel that underlie the caliche caprock.

There are approximately 120 active mineral material pits in the Carlsbad Resource Area in the course of a single year. The majority of these are caliche pits. The locations of pits are recorded on maps in the Carlsbad Resource Area office.

LANDS AND REALTY

Public lands are fairly well consolidated in Eddy County and the western portion of Lea County, while a scattered land pattern predominates eastern Lea County and southwest Chaves County.

WITHDRAWALS

Currently, approximately 36,000 acres of public lands have been withdrawn from the operation of the public land laws for the Brantley Dam project. Those lands are presently managed by the Bureau of Reclamation. Upon completion of the Brantley Dam project, the lands that are no longer needed for the project will be returned to BLM administration.

RIGHTS-OF-WAY

The Carlsbad Resource Area has an active rights-of-way program that directly supports the activity of the oil and gas industry. Approximately 550 authorizations are processed each year. Almost all of these are directly related to oil and gas.

RIGHTS-OF-WAY CORRIDORS AND AVOIDANCE AREAS

In order to facilitate extensive energy transmission needs of oil and gas and potash development, five right-of-way corridors have been identified through current planning efforts for the resource area. The corridors were established by either the placement of numerous transmission or pipe lines along the same alignment as a result of topographic and land ownership constraints, or by the placement of one particularly large line in a key location. The existing 345 kilovolt transmission line corridor from just east of Artesia to Las Cruces is critical, as there are few suitable crossings over the Guadalupe Mountains. There are several rights-of-way crossing the Pecos River.

A very limited number of rights-of-way avoidance areas (0.3 percent of Resource Area) have been designated under previous planning efforts. Though not formally called rights-of-way avoidance areas, they are managed for the protection of sensitive resources. Additional rights-of-way avoidance areas are identified in Chapter 2.

RANGELAND RESOURCES

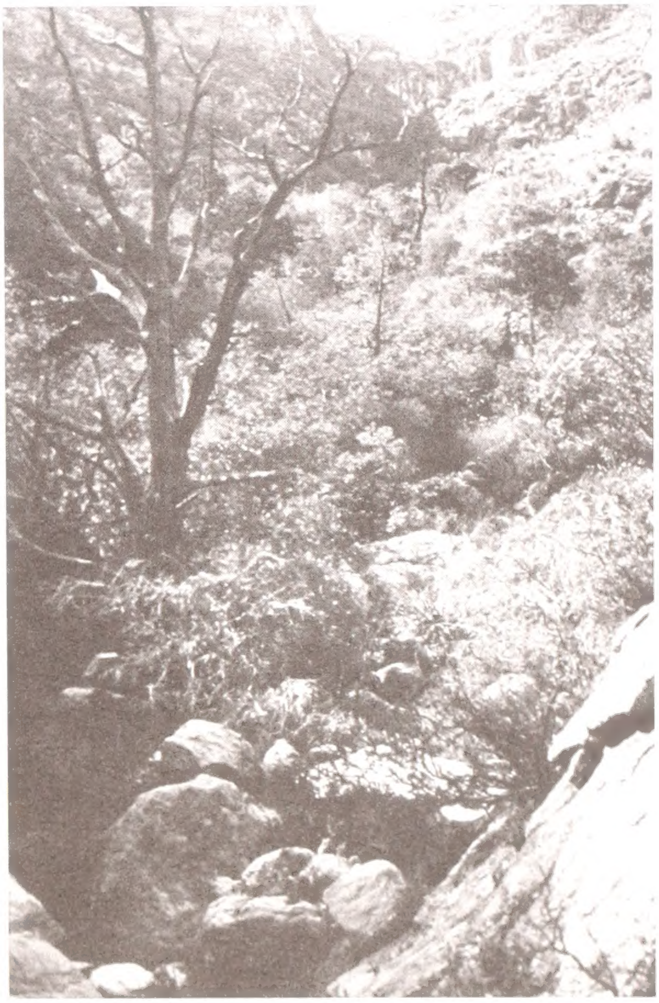
The Carlsbad Resource Area contains 286 grazing allotments, which cover approximately 2.19 million acres of public land. There are 243 permittees currently licensed to graze livestock. The current active grazing preference in the area is 374,488 animal unit months (AUMs).

VEGETATION

In the early and mid-1800s, the southeastern plains of New Mexico were vegetated by short-grass prairies (Whitfield and Beuter 1938; Dick-Peddie 1965). These grassland communities were dominated by grama grasses (black, blue, gyp, hairy and sideoats), bluestems, and dropseeds. Low densities of brush were scattered throughout the prairies. Dramatic changes in vegetation composition, influenced by a combination of climatic changes (Wedel 1957; Hastings and Turner 1965), cessation of natural wild prairie fires (Humphrey 1952; Wright 1974), and poor livestock management (Haskell 1945; Brown 1950) caused creosote, mesquite, and snakeweed to increase, thus reducing the amount of soil moisture available for the production of grasses and forbs (Herbel 1965).

RANGE SITES

Three major land resource areas occur in the Carlsbad Resource Area: Canadian-Pecos Plains, High Plains, and Southern Desert. Major land resource areas are distinguished by differences in elevation, topography, climate, soils, and potential natural vegetation. A number of range sites occur within each major land resource area. A range site is a area where the "absence of abnormal disturbance and physical site deterioration has the potential to support a native plant community typified by an association of species different from that of other sites" (Society for Range Management 1974).



Dense riparian vegetation often occurs in steep canyons of the Guadalupe Mountatins.

A range site occurring within two different major land resource areas will differ in vegetation production as well as the proportion of species present. For analysis purposes, the range sites that were inventoried in the planning area were grouped together in seven major categories based on similarities in soils and vegetation.

RANGE SITE CATEGORIES

Loamy

The potential plant community of this category consists of blue grama, black grama, sideoats grama, galleta, and tobosa. Winterfat, fourwing saltbush, and yucca are the principal shrubs. Forbs include croton and desert holly. Brush species such as snakeweed, mesquite, and cholla cactus increase as ecological condition decreases.

Gyp Complex

The potential plant community of this category consists of gyp grama, gyp dropseed, blue and black grama grasses, and the forb, coldenia. Shrubs and forbs are a minor component of the plant community. Sites in this category are easily damaged by heavy grazing pressure, which causes a loss in cover and deterioration of the plant community.

Limestone Hills

The potential plant community of this category consists primarily of grasses such as black grama, sideoats grama, metcalf muhly, mountain muhly, and tridens. Yucca, sacahuista, mariola, and catclaw mimosa become more prevalent on north and east slopes. In deteriorated condition, sites in this category will show an increase in woody plants and grasses, such as threeawns and tridens.

Shallow

The potential plant community of this category consists of black grama, sideoats grama, hairy grama, bush muhly, and sand dropseed. Creosote bush, mesquite, mariola, and catclaw mimosa also occur on the site. In a deteriorated condition, unpalatable species such as fluff grass, and creosote bush, mesquite, and catclaw mimosa will increase over sites in this category.

Very Shallow

The potential plant community of this category consists of black grama, sideoats grama, tridens spp., blue grama, dropseed spp., sacahuista, yucca spp., sotol, and catclaw mimosa. In a deteriorated condition, fluff grass, tridens spp., sacahuista, yucca, and other unpalatable woody species will increase throughout sites in this category.

Sandy

The potential plant community of this category consists of dropseeds (sand, spike, and mesa), bluestems, and black grama. Yucca, fourwing saltbush, and shinnery oak are the principle shrub species. As deterioration occurs, plants such as threeawn grass and mesquite will increase and soil hummocking will occur.

For more detailed information about the major land resource areas and range sites in the planning area, refer to the SCS Range Site descriptions.

CULTURAL RESOURCES

From the earliest well-documented Native American cultures in the Southwest at around 9,000 B.C., to the final displacement of the Mescalero Apaches in the late 1800s, southeastern New Mexico was used at least seasonally by bands of nomadic hunters and gatherers. Drawing on an intimate understanding of their environment they were able to thrive on the various wild resources available in the region. There is some evidence suggesting that within the last centuries before Spanish contact, agriculture may also have been practiced on a limited basis in some favorable areas.

By closely monitoring the environment and moving in concert with seasonally available resources, aboriginal people would have found edible and otherwise useful plants, and big and small game, in abundance throughout the area. The landscape provided stone for making flaked, ground, or pecked tools, as well as for construction of roasting ovens, hearths, and other features.

Permanent or seasonal water sources were and are scattered throughout the area and were a focal point for base camps. These vital locations were used again and again, sometimes over thousands of years, resulting in the extensive, multi-component archeological sites present today. Smaller satellite sites, probably used as processing stations or short-term camps during gathering rounds or forays, are scattered by the thousands throughout the resource area.

Late prehistoric pithouse village sites, which appear to have been occupied more or less permanently, have been identified in the sandy areas east of the Pecos River. In the rocky uplands on the west side of the resource area, aboriginal sites include shallow rockshelters and caves which were used as temporary houses and work areas and for storage of equipment and gathered foods. Pictograph panels provide an enigmatic glimpse of another side of prehistoric life, suggesting ritual and art, and giving clues to outside contacts and influences.

In the late 1500s, the earliest Spanish chroniclers to visit the area documented encounters with Jumano and Apachean peoples practicing hunting and gathering and engaging in trade with Puebloan villagers to the west. Within a few generations Europeans had become established in the most favorable farming and grazing lands along the Rio Grande and in Texas. Large-scale population movements, disease, and a thriving trade in slaves, horses, European goods, and bison products, between and among native groups and Spaniards, prompted the evolution of the traditional native lifeway into an economy based on bison hunting on the Llano Estacado, and alternately raiding and trading with both Spanish and Indian settlements to the east and west. The rugged back country between the settlements, including what is now southeastern New Mexico, remained firmly under the control of native groups throughout the Spanish and Mexican periods. Some evidence suggests that small groups of Mexican or mixed Mexican-Indian affiliation may have occupied parts of the resource area sporadically along with native groups prior to the Anglo-American intrusion.

The Native American raid and trade subsistence pattern continued until the acquisition of the territory by the United States government in the early 1800s. Unrelenting warfare with the technologically superior Anglo-American military and settlers gradually decimated the nomadic bands. By the late 1870s, remaining Indian populations in southeastern New Mexico had been forced onto reservations, and the region was rapidly settled by Anglo-American ranchers and farmers. In the rapid and violent replacement of proto-historic Indian and pre-Anglo Mexican societies with Anglo-American culture, our knowledge of events and lifeways in the area over the preceding 400 years suffered greatly. Archeological sites which have survived subsequent vandalism are almost our only record of the history of this period.

No historic sites in the resource area dating to the Spanish and Mexican periods have yet been identified, although place names and military accounts document the ephemeral presence of these groups. A handful of camp sites which may be attributable to Apaches during the 1800s are on record. These include sites with tepee rings and stone age sites with rare metal or glass artifacts. Continued inventory and radiocarbon dating of sites, along with refinement of our conception of what sites of this period should look like will almost certainly identify material evidence of the protohistoric period.

Sites relating to early ranching operations in the late 1800s are present but rare on public lands in southeastern New Mexico. These include stone corrals and cowboy or sheep herder camps. Early 20th century sites are fairly common. These include ranching and farming facilities and debris related to homestead sites. The homesteads themselves, however, generally passed into private ownership and are not presently managed by the BLM. Several well-preserved examples of early oil and gas drilling operations and early potash mining sites are also present on public lands. Some debris which can be related to military use of the landscape for training in the early years of the second World War are also known.

INVENTORY AND SUMMARY

Cultural resource inventories in the Carlsbad Resource Area have been largely limited to small projects associated with oil and gas exploration or development, or with installation of water pipelines, fence lines or other BLM-initiated range projects. To date, as a result of over 9,300 inventories, approximately 210,000 acres, or 5.25 percent of public lands in the Carlsbad Resource Area have been inventoried for cultural resources. These efforts have resulted in the recording of more than

3,750 cultural resource sites. Based on these data, if the entire resource area were inventoried for cultural resources, approximately 67,000 additional cultural resource sites would be expected to be identified.

Of the recorded sites, 95 percent or more date to the prehistoric and protohistoric time periods (from about 11,000 years ago to about A.D. 1860). Less than 5 percent of the recorded sites are the result of historic period activities (from about A.D. 1860 to 1940). This data base is growing rapidly and is expected to continue to increase with continued inventory in support of oil and gas development.

In the Carlsbad Resource Area, two National Register Archeological Districts have been designated: Laguna Plata and Maroon Cliffs. Each district includes numerous sites that are significant individually and as interconnected complexes of sites. In addition, BLM site records indicate that 80 percent or more of all identified sites in the resource area may be eligible for the National Register of Historic Places.

Cultural resource sites on public lands in the Carlsbad Resource Area constitute an invaluable record of environmental and cultural conditions and events in southeastern New Mexico over the past 11,000 years. Preservation and systematic investigation of such sites should aid us in understanding how the ecosystems BLM manages have changed through time, how human land uses have modified these ecosystems in the past, and how present-day land use practices and proposals now, or are likely to, affect the health of these ecosystems.

PALEONTOLOGICAL/GEOLOGICAL RESOURCES

PALEONTOLOGY

The Carlsbad Resource Area contains valuable paleontological resources in caves and numerous other sites. The Capitan Reef, one of the most famous fossil reefs known, lies partly within the resource area. This reef was formed mainly from lime-secreting algae.

Mollusk fossils of Lower Cretaceous age are known to occur near North Lake and Eunice in Lea County. Triassic-age rocks outcrop in several localities in Eddy and Lea Counties. These latter rocks could contain fossils of terrestrial flora and fauna.

Vertebrate and invertebrate fossils of Pleistocene and Holocene age are also a significant paleontological resource. Many of the cave and karst features on public land are particularly rich sources for such fossils. Two important sites are Dry Cave and Big Manhole Cave. Several hundred species of animals, many of which are extinct, have been identified from these caves. These caves contain stratified sedimentary deposits which document an almost continuous record of environmental conditions spanning at least the last 30,000 years.

The results of scientific research in these caves have a critical relationship to our knowledge of the paleoecology and the health of present-day ecosystems in the region. A significant management benefit will be realized by providing a time perspective on how natural processes affect the development and alteration of ecosystems.

GEOLOGY

The entire Carlsbad Resource Area lies within the Permian Basin, with deposits formed from shallow sea deposition and subsidence. Structural features encountered within the Permian Basin of southeast New Mexico include the Northwest Shelf, the Permian Reef, the Delaware Basin, the Tatum Basin, and the Central Basin Platform. The Northwest Shelf extends from the Capitan Reef northward and contains the majority of the large oil field discoveries in southeastern New Mexico.

The Permian Capitan Reef was formed during a period of shallow water and is nearly circular in shape, elongated somewhat in a northwest to south direction, with the northern one-third located in Eddy and Lea Counties. The reef enters New Mexico in the southwestern corner of Eddy County, forming a part of the Guadalupe Mountains, and is traced to the northeast to Whites City and Carlsbad, where it swings east. As it enters Lea County, it bends toward the southeast and leaves New Mexico near the southeastern corner of the county. The reef is approximately 12 miles wide at the widest part. Many caves occur in the reef area, including Carlsbad Caverns.

The portion of the Delaware Basin in the resource area is mostly in southern Eddy County. It represents the area of maximum subsidence in the New Mexico portion of the Permian Basin, and it is here that the Permian strata are thickest. Extensive drilling in the Delaware Basin has revealed large deposits of oil and natural gas at depths as great as 14,000 feet.

The Tatum Basin is located in northern Lea County, centered around the town of Tatum, on the northwest shelf of the greater Permian Basin. The basin was formed during the Early Pennsylvanian Age. There are about forty oil and gas fields present in this area.

The Central Basin Platform extends in a north-northwesterly direction from West Texas into southeastern Lea County. It is a broad belt of uplifted Precambrian rocks and strata of Cambrian to Pennsylvanian Age. Only the northwestern portion of the platform is in New Mexico. It was raised from the sea bottoms in late Mississippian or early Pennsylvanian time and over it the sedimentary formations were broadly arched. Erosion accompanied and followed uplift, and a thick series of Pennsylvanian strata were deposited in adjacent basins. In places, erosion proceeded to the Precambrian basement rock. Subsidence followed uplift and early or middle Permian sediments were deposited on Precambrian rocks and the truncated edge of Precambrian strata. (Stipp, 1960).

As a result of deposition during the Paleozoic era, oil and gas, potash, salt, and other strata carrying economically valuable mineral materials occur in abundance in various parts of the resource area.

Important reserves of oil and gas occur in most parts of the stratigraphic section with the exception of the Mississippian. Although thousands of wells have been drilled in the resource area in the past 45 years, examinations of drilled formations reveal that only a small percentage of the total volume of rock has been tested.

OUTDOOR RECREATION

The resource area provides a variety of recreation opportunities. Most of the recreation use is independent of recreational development and is considered to be resource dependent. These dispersed recreation use opportunities include hunting, camping, picnicking, mountain biking, fishing, horseback riding, hiking, climbing, caving, sightseeing, and recreational off-highway vehicle (OHV) use. These activities occur throughout the resource area.

HUNTING AND FISHING

The resource area supports extensive deer hunting use, particularly west of the Pecos River, and widespread quail and dove hunting. The greatest use is within NMDG&F game hunting unit 30, where large numbers of licensed deer hunters visit each year.

Camping, picnicking, and sightseeing occur throughout the resource area, usually in conjunction with other recreational pursuits such as hunting, fishing along the Pecos River and at Red Bluff Reservoir, OHV use, and caving (particularly at the McKittrick Hill caves area).

Public lands along the Pecos River serve an important role in providing warm water fishing opportunities. These lands are scattered, with access uncertain in some locations. Red Bluff, Avalon and Brantley reservoirs are probably the more important areas for water sports, especially boating and fishing.

OFF-HIGHWAY VEHICLES

Off-highway vehicle use is conducted in conjunction with geophysical and other oil and gas development activities, ranching, hunting, and other recreational pursuits. Recreational OHV use is heaviest east of the Pecos River. Motorcycle use is scattered throughout the resource area, but is especially concentrated near Hackberry Lake, Alkali Lake, and between Carlsbad and Hobbs near U.S. Highway 62/180. Sand dunes along State Route 31 north of U.S. Highway 62/180 are also popular for motorcycles, dune buggies and four wheelers. The Hackberry Lake Motorcycle Enduro has been a competitive event drawing from 200 to 400 participants and spectators annually since 1980. These competitive races are on the national enduro racing circuit.

Off-highway vehicle use designations have been established for public lands in the resource area.

These lands were designated open, except for those special management areas (SMA) in which uncontrolled OHV use would cause unacceptable resource damage. The SMAs designated in the Carlsbad RMP as being limited or closed to OHV use are: Laguna Plata, Pope's Well, Pecos River Canyons, Maroon Cliffs, Seven River Hills, Caves SMA, South Texas Hill Canyon, Dark Canyon, Lonesome Ridge, Springs SMA, Yeso Hills, Blunt Nosed Shiner Habitat SMA, Little Mckittrick Draw, Potash Bull Wheel, Phantom Banks Heronries, Poco Site, Bear Grass Draw, Guadalupe Escarpment Scenic Area, Pecos River Corridor, and the Southern Gypsum Soil Area. These areas total approximately 160,000 acres. Specific resource values, acreages, and locations for these areas can be found in Appendix C of the Carlsbad RMP. In addition, about 1,260 acres of public land in the Black River Management Area are temporarily closed to all motorized vehicles.

Caving is a major recreational activity in the Carlsbad and Roswell Resource Areas.

CAVES AND KARST

Caves and karst features occur primarily in the central portion of the resource area, which contains about 387,000 acres of limestone and gypsum deposits. There are over 250 known caves in the resource area, with the high probability for discovery of many others. Caves in the resource area are used for recreation, education, scientific research, wildlife habitat, and provide sources for groundwater recharge.

Sixteen of these caves are gated and require written authorization for entry. Recreational caving use has been gradually increasing over the past several years. About 300 recreational cave permits are issued each year, which account for approximately 2,000 visitor use days. Approximately 80 percent of these permits are for three recreational caves in the McKittrick Hill Caves Special Recreation Management Area. The remaining permits issued for recreational use are dispersed among other caves. Visitor use records of recreational caving for the ungated caves is estimated as nearly equal to the permitted use. These estimates are made through the use of registers. Two to four requests are received annually for various types of speleological research, including studies in paleontology, geology, mineralogy, hydrology, and biology.

Caves and karst resources on public lands serve a very important role for the general public and caving community, and for wildlife habitat. Many of the caves are more easily accessible, generally easier to find, and require less technical caving skills than caves in the neighboring National Forest and National Park. Driving time from Carlsbad is also significantly less. As a result, caves in the resource area are appealing to novices, larger groups, and cavers having limited time. Consequently, the BLM caves, particularly the McKittrick Hill caves and the ugated Parks Ranch Cave, receive heavy use and are extremely important in meeting the demand for caving. Three ACECs have been designated either primarily or in part due to cave and karst resources. These ACECs are: Lonesome Ridge, Dark Canyon, and Chosa Draw.

The majority of the karst features in the Carlsbad Resource Area are formed in gypsum. These gypsum karst lands serve as discrete recharge areas for groundwater, which becomes available for use through windmills, seeps and springs. The water is often used for domestic purposes, in the ranching industry, and by wildlife. The caves and groundwater conduits provide a unique and fragile ecosystem.

Current oil and gas drilling and operations are given direction through the *Interim Guide for Oil & Gas Drilling Operations in Cave and Karst Areas*. For purposes of classifying cave and karst occurrence, the Interim Guide divided the Roswell District into three geographical zones identified as having high, medium or low potential for cave and karst occurrence. Soluble rock types and structure are the primary factors related to these potentials. High potential areas contain more dense concentrations of known caves or karst features and have a high probability for caves. Medium potential areas are those containing soluble rock types and may contain a few scattered caves with the potential for additional caves. Areas with low potential have geologic settings that do not normally support cave or karst development. Nevertheless, a low potential designation does not preclude a discovery of caves. Map 26 identifies the areas of cave or karst areas in the Carlsbad Resource Area, and Table 89 provides information that further describes those areas.

RECREATION OPPORTUNITY INVENTORY

An inventory has been conducted using the Recreation Opportunity Spectrum (ROS) classification system to identify recreational opportunities available in the resource area. This system has six classified recreation opportunity classes (see Map 27). The public land acreage for each class is: Primitive, 3,000 acres (less than 1 percent); Semi-primitive Nonmotorized, 53,100 acres (2 percent); Semi-primitive Motorized, 1,063,320 acres (48 percent); Roaded Natural, 1,071,520 acres (49 percent); Rural, 5,780 acres (less than 1 percent); Urban, 280 acres (less than 1 percent).

WILDERNESS

There are four Wilderness Study Areas (WSA) in the resource area, each smaller than 5,000 acres (See Map 28). Devil's Den Canyon and McKittrick Canyon WSAs are adjacent to the Guadalupe Escarpment Wilderness Study Area in the Lincoln National Forest, Guadalupe Ranger District. The Lonesome Ridge WSA is adjacent to the Guadalupe Escarpment WSA and to the designated wilderness in the Guadalupe Mountains National Park. The Mudgetts WSA is adjacent to designated wilderness in Carlsbad Caverns National Park. The WSAs are being managed under the BLM's Interim Management Policy.

VISUAL RESOURCES

Visual resource management (VRM) objectives have been determined for all public lands in the Carlsbad Resource Area. These objectives were derived from previous land use planning and visual resource inventories for lands in the resource area. Four management objectives have been established based on scenic quality, visual sensitivity, and distance from key observation points. These objectives (classes) describe the different degrees of modification allowed in the basic elements of the landscape. Visual resource management classes range from Class I, which allows the least amount of change in the natural landscape character, to Class IV, which is the least restrictive for changes to landscape character. See Map 29 for locations of VRM classes. The approximate acreage for each class is: VRM class I, 3,000 acres; VRM class II, 38,000 acres; VRM class III, 276,000 acres and VRM class IV, 1,854,000 acres.

Cave or Karst Occurrence Areas

- ▩ High Potential
- ▤ Medium Potential
- ☐ Low Potential

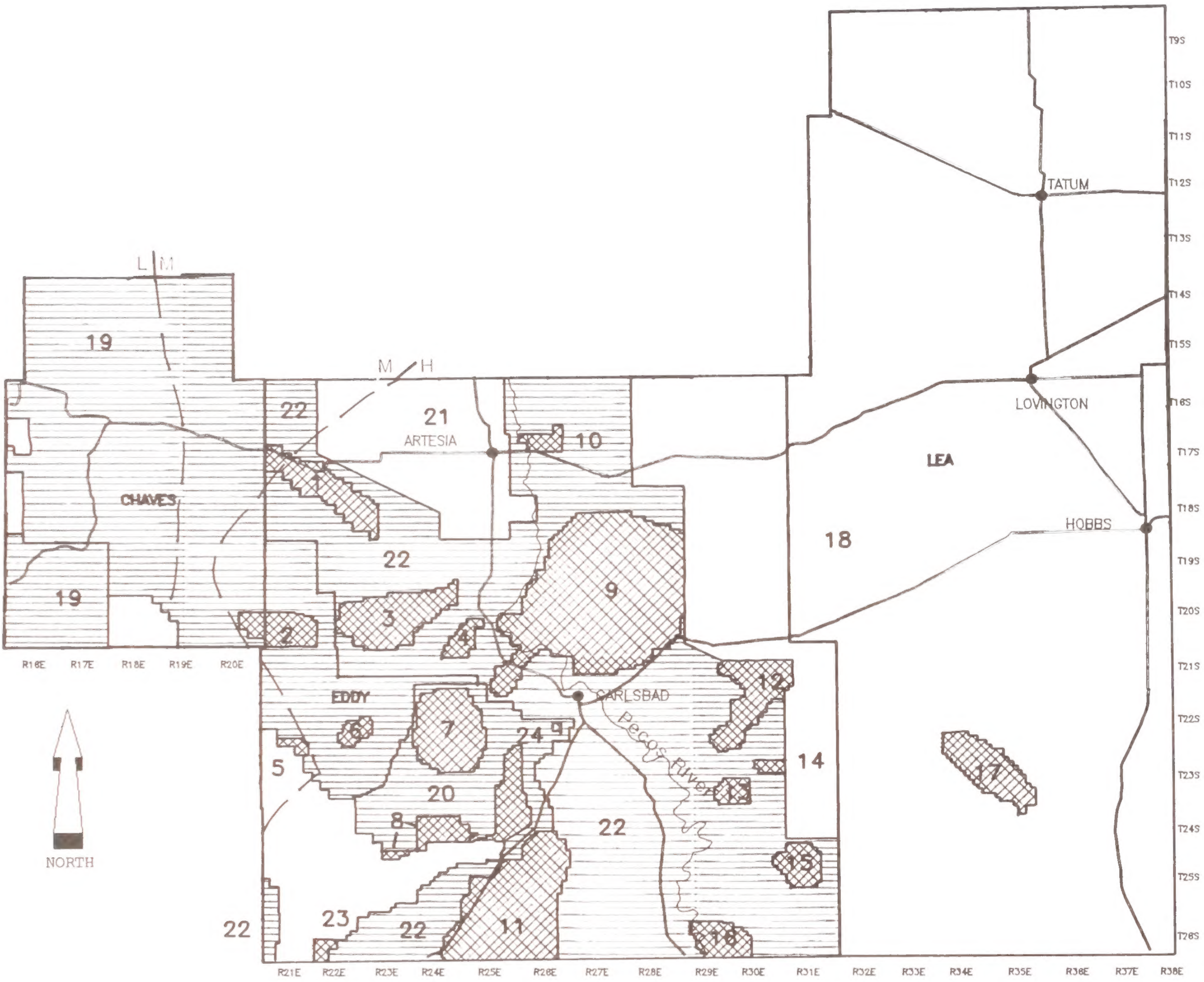
Oil & Gas Potential
Occurrence Boundaries

H = High Potential

M = Moderate Potential

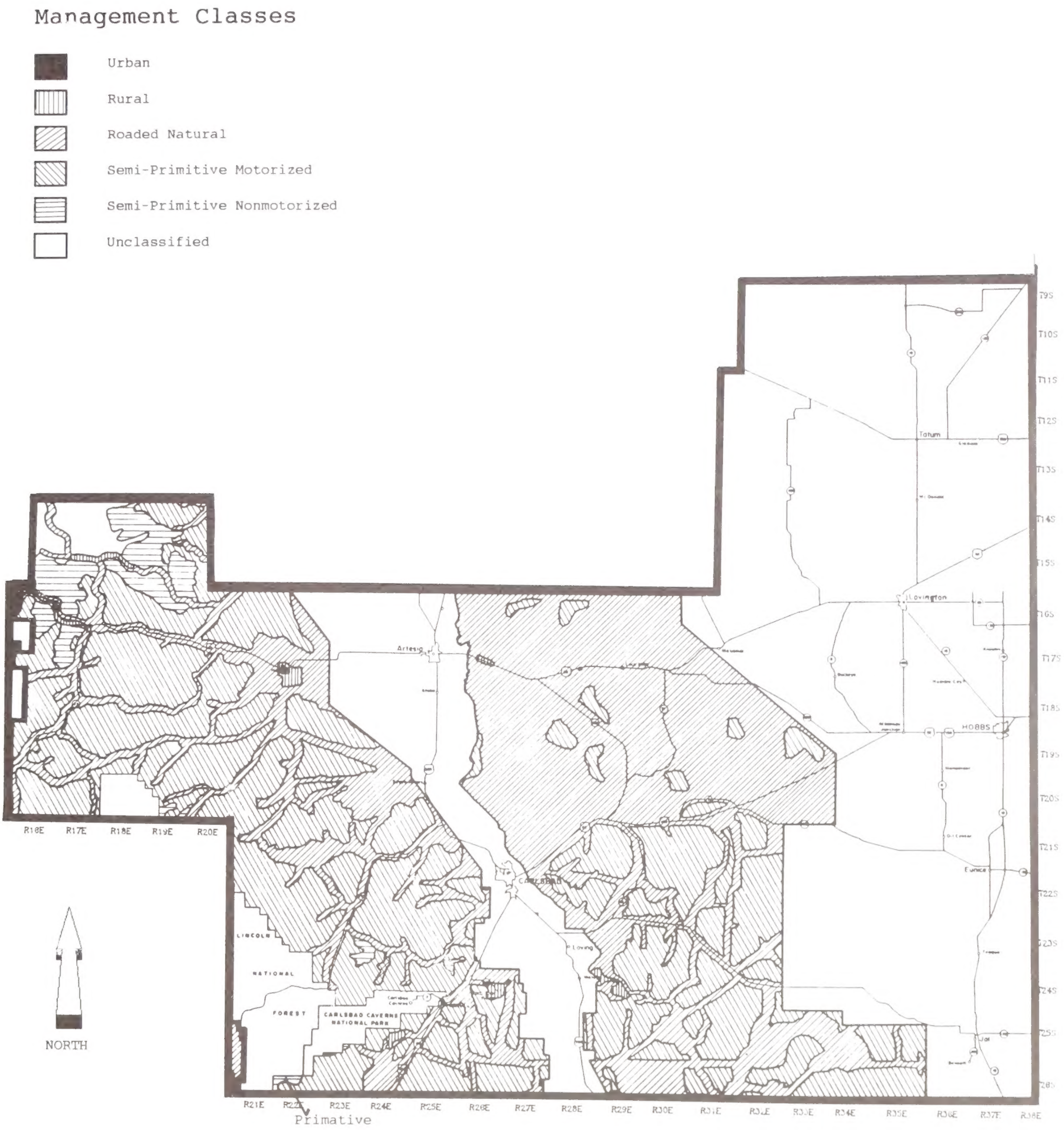
L = Low Potential

NOTE - The table associated with this map shows the relative depth of each area shown on this map. For example, area number 9 is the Burton Flats area which has a high potential for the occurrence of caves or karst features to a depth of 350 feet.



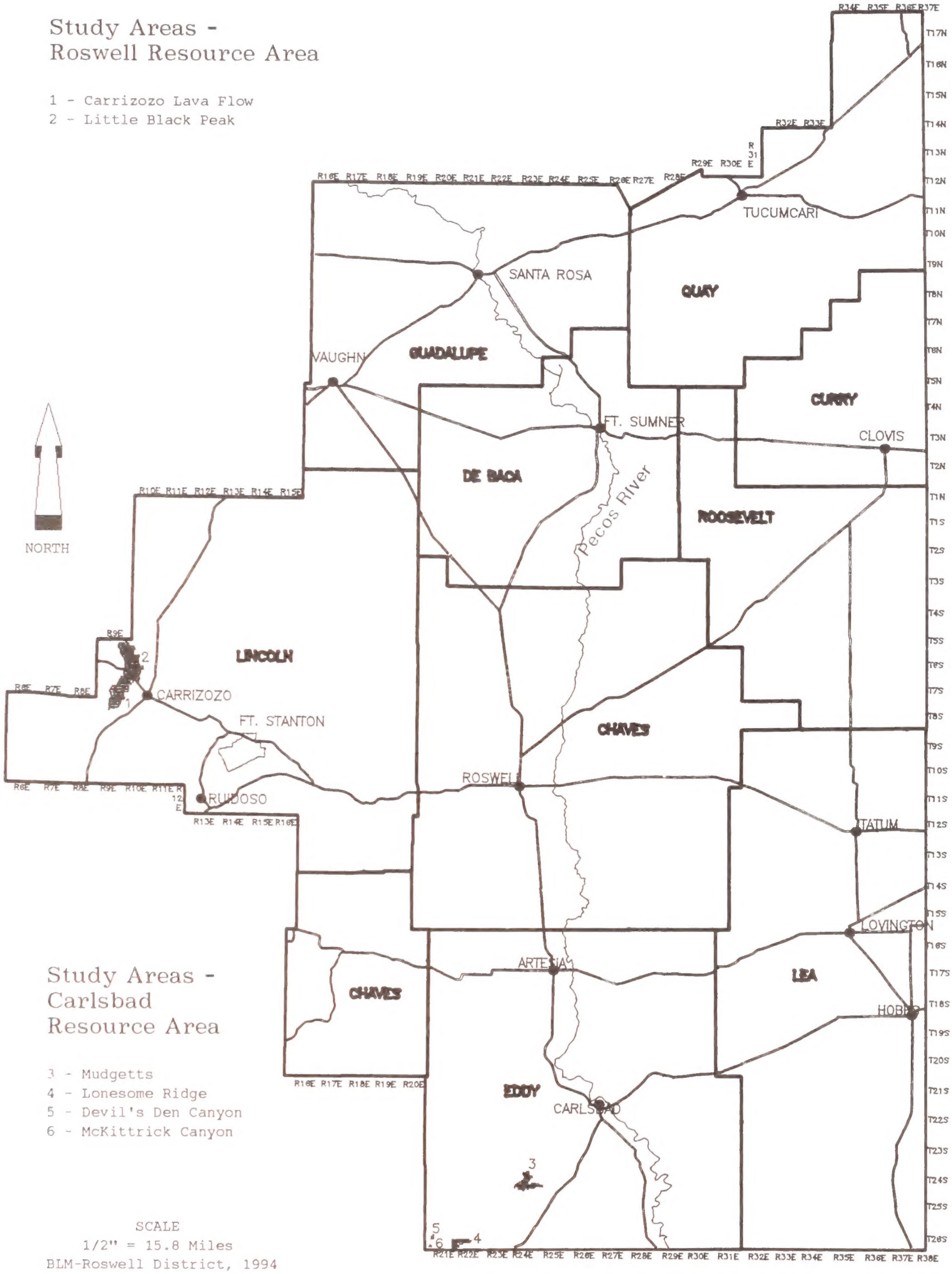
SCALE
1/2" = 9.5 Miles
BLM-Roswell District, 1994

MAP 26
CAVE or KARST OCCURRENCE AREAS
Carlsbad Resource Area



SCALE
1/2" = 9.5 Miles
BLM-Roswell District, 1994

MAP 27
RECREATION OPPORTUNITY SPECTRUM
Carlsbad Resource Area


NORTH
QUAY
GUADALUPE
CURRY
DE BACA
ROOSEVELT
LINCOLN
CHAVES
CHAVES
LEA
EDDY
TUCUMCARI
SANTA ROSA
VAUGHN
FT. SUMNER
CLOVIS
Pecos River
CARRIZOZO
FT. STANTON
RUIDOSO
ROSWELL
TATUM
LOVINGTON
ARTESIA
HOBBS
CARLSBAD
1
2
3
4
5
6
R34E R35E R36E R37E
R32E R33E
R29E R30E R31E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R10E R11E R12E R13E R14E R15E
R9E
R6E R7E R8E
R6E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R16E R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S T16S T17S T18S T19S T20S T21S T22S T23S T24S T25S T26S

Study Areas -
Roswell Resource Area

1 - Carrizozo Lava Flow
2 - Little Black Peak

Study Areas -
Carlsbad
Resource Area

3 - Mudgetts
4 - Lonesome Ridge
5 - Devil's Den Canyon
6 - McKittrick Canyon

SCALE
1/2" = 15.8 Miles
BLM-Roswell District, 1994

MAP 28
WILDERNESS STUDY AREAS
Roswell District

TABLE 89
CAVE OR KARST OCCURRENCE AREAS
CARLSBAD RESOURCE AREA

Area[1]	Area Name	Depth[2]	Potential[3]
1	Hope	350	High
2	Deer Canyon	500	High
3	Sinkhole Flats	350	High
4	Seven Rivers Hills	350	High
5	Three Forks	500	High
6	Dunaway Canyon	500	High
7	Azotea Mesa	2,500	High
8	Guadalupe Ridge	2,500	High
9	Burton Flats	350	High
10	Dog Canyon Draw	350	High
11	Chosa Draw	350	High
12	Nash Draw	350	High
13	Remuda Basin	350	High
14	Los Medanos	350	High
15	Big Sinks	350	High
16	Red Bluffs	350	High
17	San Simon Swale	350	High
18	High Plains	None	Low
19	East Guadalupe Escarpment	500	Medium
20	Dark Canyon	1,500	Medium
21	Artesia	None	Low
22	Medium Potential	350	Medium
23	Lonesome Ridge	2,500	High
24	Lost Cave	1,500	High

[1] Refers to areas on the "Cave or Karst Occurrence Areas" map for the Carlsbad Resource Area.

[2] Lowest likely depth, in feet, at which caves might be expected, measured from the surface. No cave depth for low potential areas.

[3] Potential for cave or karst occurrence.

Source: BLM files, 1994.

Of particular visual significance in the resource area are the areas and travel routes associated with Carlsbad Caverns National Park, and the U.S. Forest Service's Guadalupe Ranger District. The high numbers of tourists traveling to Carlsbad Caverns National Park, and the Guadalupe Mountains make these highly sensitive visual areas.

SOIL RESOURCES

Detailed information on soils in the Carlsbad Resource Area is available in the Soil Survey of Eddy Area N.M. (SCS 1971), Soil Survey of Chaves County, N.M., Southern Part (SCS 1980) and Soil Survey of Lea County, N.M. (SCS 1974). Table 90 and Map 30 contain a general overview of slope in the Carlsbad Resource Area.

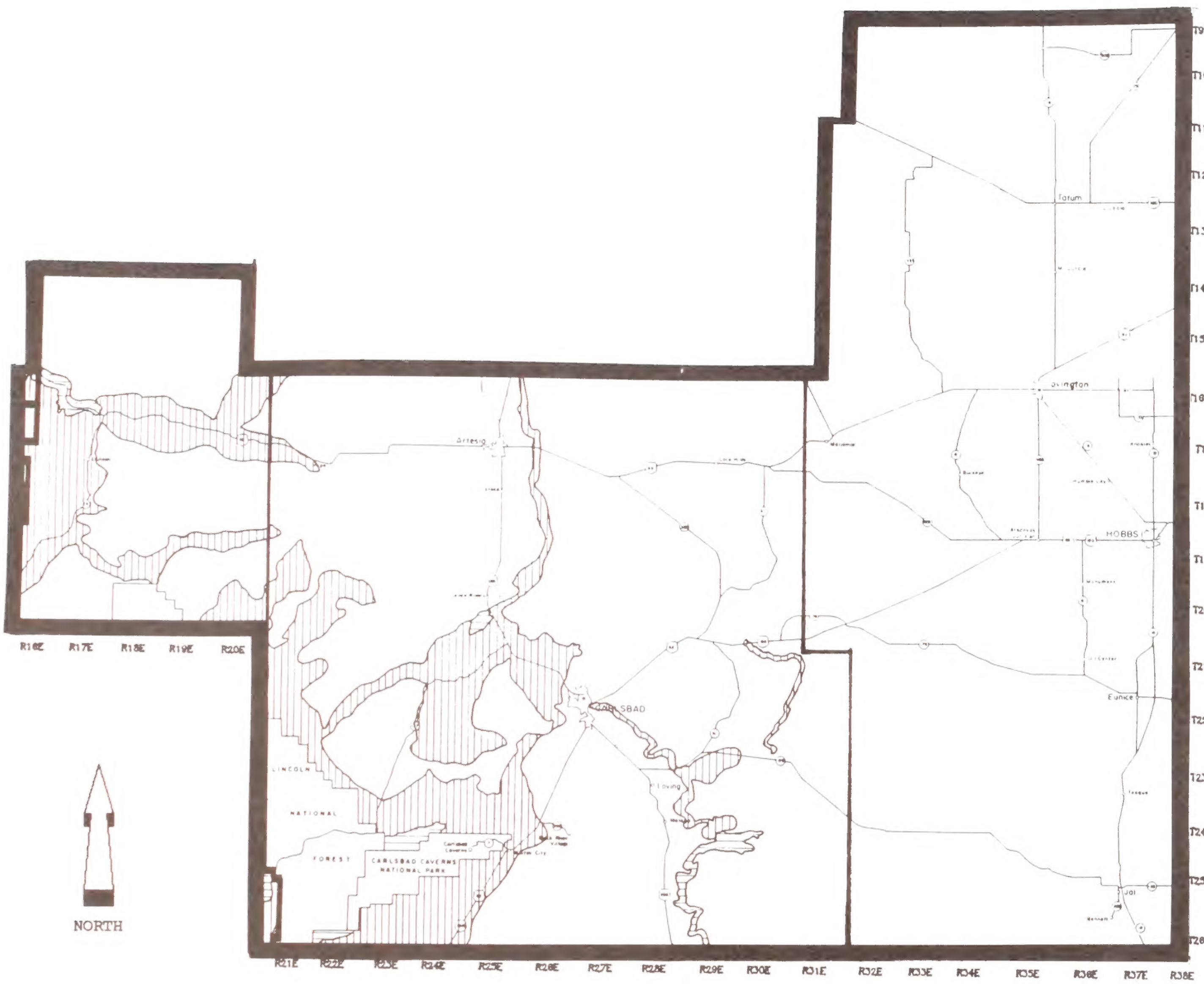
Soils west of the Pecos River ("the west side") vary from mostly very shallow in the western portion of the area to mostly deep along the Pecos River. The shallow soils occur on rolling limestone hills and are generally less than 20 inches in depth. The rocky composition of the soil, combined with shallow depths, increases runoff, which increases the water erosion hazard in associated draws and drainages. Soil textures are mostly loamy. High concentrations of calcium carbonate occur in the substratum. In

Management Classes

▤ Class II

▥ Class III

☐ Class IV



SCALE
1/2" = 9.5 Miles
BLM-Roswell District, 1994

MAP 29
VISUAL
RESOURCE
MANAGEMENT
Carlsbad Resource Area

addition to limestone, large areas of soils have formed from gypsiferous parent material.

Soils east of the Pecos River ("the east side") are mostly level with sandy textures and high concentrations of calcium carbonate in the substratum. These sandy soils are highly susceptible to wind erosion. Wind action has produced an undulating topography with frequent dunes. Areas of steep rocky soils and gypsum soils are also present.

The Gyp Complex soils are highly susceptible to erosion. The largest gyp complex area is located south of Whites City and includes the Yeso Hills area. Once disturbed, these gypsum soils are extremely difficult to revegetate due to their high salt content and the frequent droughts in the region.

EROSION AND SEDIMENTATION

Sediment control plans have been prepared for New Mexico counties (New Mexico Soil and Water Conservation Division 1976). Included in each sediment control plan is a map of estimated long-term average soil loss, expressed in acre-feet per square mile per year. Note that the soil loss figures represent gross erosion (i.e. the sum of sheet, rill, gully, and stream erosion), rather than sediment yield (see glossary).

Map 31 shows that portions of eight watersheds in the Carlsbad Resource Area (CRA) are susceptible to severe long-term soil loss (i.e. mean annual soil loss estimated to be equal to or greater than 1.0 ac-ft/mi^2/yr). Included are: (1) the closed drainage area to Nakee Ishee Lakes, (2) Elk Canyon, (3) southern Lea County, (4) Cedar Lake and surrounding closed basins, (5) Red Lake and surrounding closed basins, (6) lower Nash Draw, (7) Pecos River from Culebra Bluff to Scoggin Flat, and (8) Pecos River from Pierce Canyon to Delaware River.

RECLAMATION POTENTIAL

Almost all oil and gas wells and most roads in the resource area are surfaced with caliche. Normally, reclamation of these areas involves leaving the caliche material on the road or pad, and ripping and reseeding the area. Since caliche is quite infertile, the areas treated in this way rarely regain their former productivity, and potential for rehabilitation is low.

The mud pits used for oil and gas drilling contain high concentrations of salts. When these areas are reclaimed, the salts prevent any significant amount of plant growth. (Oil and Gas Leasing in the Roswell District, EA, BLM, 1981)

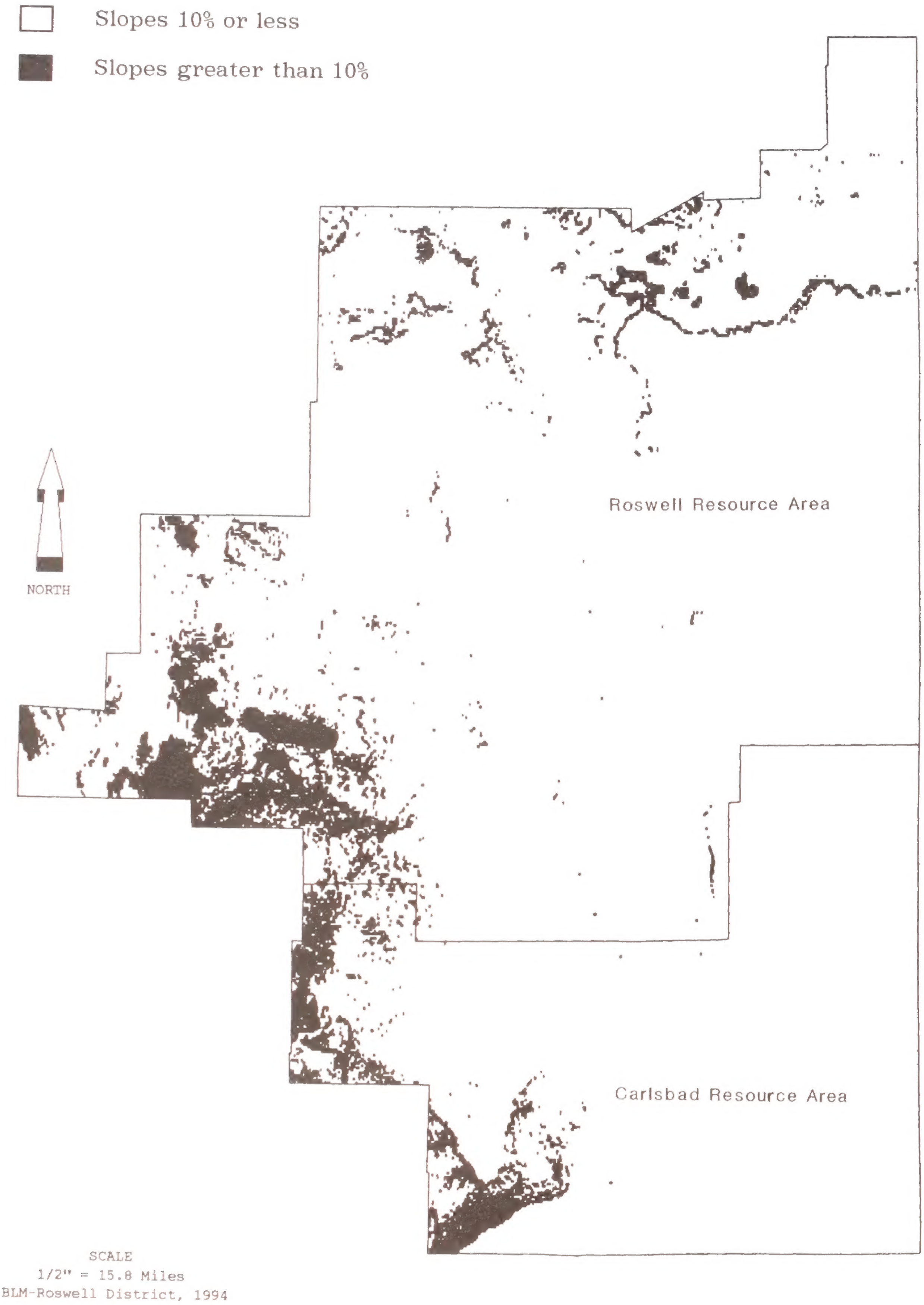
WATER RESOURCES

SURFACE WATER

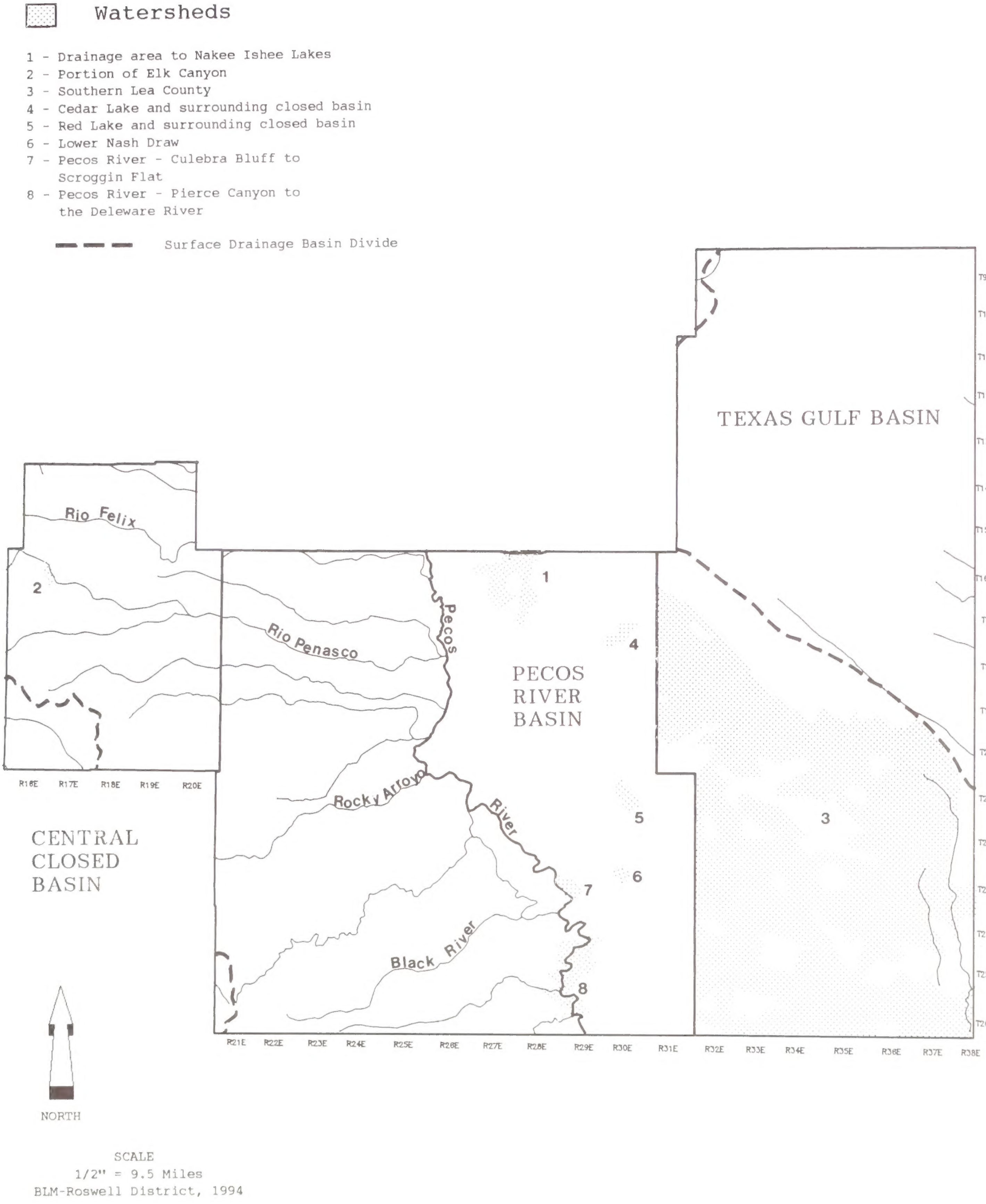
Approximately 76 percent of the resource area is in the Pecos River Basin, 23 percent is in the Lea Plateau Basin and 1 percent in the Salt Basin. The Salt Basin and the Lea Plateau Basin are closed drainage basins. Major tributaries of the Pecos River from the west include the Black River, the Delaware River, the Rio Penasco, Four Mile Draw, Seven Rivers, Rocky Arroyo and Dark Canyon. The Black and Delaware rivers are the only perennial tributaries. There are no well-defined tributaries from the east. Brantley Dam provides 520,000 acre-feet of storage for flood control and irrigation on the Pecos River approximately nineteen river miles north of Carlsbad.

The estimated mean annual runoff for the planning area ranges from more than 1.5 inches in the mountains to less than 0.2 inch in the valleys and plains. Intense thunderstorms from July through September normally contribute about 60 percent of the annual precipitation. The thunderstorms are the major source of flow in numerous intermittent drainage channels.

Floodplains are land areas susceptible to being inundated from any source, and include small and often dry watercourses and areas along rivers, streams, and lakes. Floodplains are delineated on Flood Insurance Rate Maps and Flood Hazard Boundary Maps issued by the Federal Emergency Management Agency (FEMA) on a county-wide basis. Floodplain management is covered by



MAP 30
SLOPE
Roswell District



MAP 31
CRITICAL WATERSHEDS
Carlsbad Resource Area

TABLE 90
SLOPE CATEGORIES
ROSWELL DISTRICT

Category by percent	Acreage	Category Acreage As Percent of Total District Acreage
Roswell Resource Area		
0-10	13,220,282	65
11-20	565,127	3
21-30	150,405	<1
31-84	109,618	<1
Carlsbad Resource Area		
0-10	5,922,374	29
10-20	255,976	1
21-30	56,132	<1
31-85	36,851	<1
Roswell District		
0-10	19,142,656	94
11-20	821,103	4
21-30	206,537	1
31-85	146,469	<1

Note: Acreages are surface areas, all ownerships.

Source: BLM files, 1994.

Executive Order 11988 (42 CFR 26951, 1977) and BLM Manual 7221.

Water quality data for the Pecos River is available from the New Mexico Water Quality Control Commission (WQCC)(1991, 1992). In general, the water quality of the Pecos River deteriorates as it flows downstream. Below Malaga Bend, the Pecos is quite saline due to discharge from brine springs and seeps. Limited available data indicate better water quality in perennial tributaries.

Surface water quality standards have been established by the WQCC (1991). Surface waters that are not fully supporting designated or attainable uses have also been identified by the WQCC (1992). Stream reaches with significant BLM acreage in their watershed include the following:

Pecos River from Rio Penasco to Salt Creek:

- Use not fully supported: Warm water fishery
- Probable Causes of Nonsupport: Metals, dissolved oxygen, unionized ammonia, total dissolved solids, siltation, reduction of riparian vegetation, and streambank destabilization.

Pecos River from Black River to Lower Tansil Dam:

- Use not fully supported: Warm water fishery.
- Probable Causes of Nonsupport: Salinity, reduction of riparian vegetation, and streambank destabilization.

Pecos River from New Mexico-Texas border to Black River:

- Use not fully supported: Warm water fishery.
- Probable Causes of Nonsupport: Metals, and salinity.

Black River:

- Use not fully supported: Warm water fishery.
- Probable Causes of Nonsupport: Salinity, siltation, nutrients, reduction of riparian vegetation, and streambank destabilization.

Delaware River from mouth to New Mexico-Texas border:

- Uses not fully supported: Warm water fishery.
- Probable Causes of Nonsupport: Salinity, siltation, nutrients, reduction of riparian vegetation, and streambank destabilization.

There are about 4,500 acres of riparian habitat in the resource area. About 4,230 acres are along the Pecos River, 235 acres are around 13 perennial springs, 20 acres along the Black River, and 10 acres along the Delaware River. Riparian areas also are discussed in the wildlife section. The BLM's water use inventory data from the springs indicate total dissolved solids, concentrations are within EPA standards for livestock and wildlife use. Some data are available about the hydrology of these areas.

There are about 350 unlined salt water disposal pits throughout the east side of the resource area. There are also many emergency pits. Temporary reserve pits are constructed for almost every new well that is drilled. No unlined pits exist on the west side. Existing management and regulations are designed to protect water quality. However, accidents or improper procedures could cause local ground water quality deterioration or spills into surface water.

GROUNDWATER AQUIFERS

Aquifers in the planning area containing fresh to slightly saline water include the Rustler, Castile, Tansill, Yates, Seven Rivers, Queen, Grayburg, Artesia, Ogalala, Capitan and San Andres Limestones, Glorieta and Santa Rosa Sandstones, and the Dockum Group. The average depth to groundwater is less than 200 feet in more than 50 percent of the resource area.

The general direction of groundwater movement east of the Pecos River is in a south-southwesterly direction toward the river. West of the river the general direction of groundwater movement is in an easterly direction.

GROUNDWATER QUALITY

Most groundwater contains more than 1,000 milligrams per liter (mg/l) of total dissolved solids (TDS), with some aquifers having concentrations greater than 35,000 mg/l. Limited water quality data (BLM files) from samples of wells in the resource area indicate TDS concentrations are within EPA standards for wildlife and livestock consumption. However, much of the groundwater in the planning area is unacceptable for human consumption due to high TDS and sulfate content.

An estimated 480 acre feet of water are consumed annually by livestock and 11 acre feet by wildlife in the resource area. Also, large quantities of water (usually saline) are used in oil and gas drilling and production.

Sandhill cranes winter in the Roswell and Carlsbad Resource Areas.

WILDLIFE

WILDLIFE HABITAT

Species diversity is high in the Carlsbad Resource Area due to the influence of the High Plains/Chihuahuan Desert ecotone. Wildlife habitat in the area is influenced by the Guadalupe Mountains to the west, the Chihuahuan desert in the southwestern portion of the resource area and the High Plains covering the eastern portion. Wildlife is most diverse in riparian sites and drainages containing trees and other shrubby vegetation.

SPECIAL HABITAT FEATURES

Special habitat features (SHF) are either manmade, such as dirt tanks and wildlife watering units, or natural, such as cliffs, tree groves, playas, springs, seeps, riverine corridors, and sink holes. The SHFs of primary importance include riparian and xero-riparian habitats, playas and tree groves. These areas provide forage and cover for big game and small mammals, and food, cover, and nesting strata for birds. The edge effect created by riparian vegetation provides the habitat diversity necessary to support a variety of wildlife species.

BIG GAME

Mule Deer

The mule deer is probably the most visible mammal species occurring along the east Guadalupe escarpment, ranging throughout the area on a yearlong basis. Scattered bands of 2 to 20 animals occupy the entire escarpment during times of dependable precipitation. When drought conditions prevail, the herds move into areas where a permanent water source (e.g., livestock waters, wildlife watering units, springs, or natural catchments) is available. These water sources become highly important and irreplaceable resources, supporting large concentrations of deer during the dry months of the year and during extended drought periods, sometimes extending over several years.

Approximately 9,100 mule deer (*Odocoileus hemionus*) inhabit public land in the resource area.

Heaviest concentrations are found in brushy drainages and bottomlands, and along the foothills of the east Guadalupe escarpment, which includes about 155,000 acres of public land. Little-leaf sumac, mesquite, little walnut, netleaf hackberry, Apache plume, and desert willow are among the common shrubs and trees that grow in these bottomlands and provide browse and cover for deer. Digitized data obtained from the NMDGF indicates that most of the deer habitat is in fair condition and in a stable trend (NMDGF estimate, 1983). However, since that time, the amount and distribution of viable habitat has been noticeably altered due to the expansion of surface disturbing activities associated with oil and gas development. The majority of this disturbance is along the foothills, drainages and rough breaks of the Guadalupe escarpment. In addition to the existing oil and gas development, there are plans for a large-scale development within the Azotea Mesa area, which could affect an additional 500 acres. Mitigation for this area has been developed in the East Indian Basin Oil and Gas Field Development Environmental Analysis (EA# NM-067-94-123).

Concentrations of deer east of the Pecos River are found in isolated areas having an adequate permanent water sources, adequate cover (dunes, escarpments, blowouts, and hummocks), an abundant food source (shinnery oak and fourwing saltbush), and generally some sort of topographic relief. These factors, and the proximity to oil and gas activity, seem to be the limiting factors regarding the distribution of mule deer east of the Pecos River. Some of the important areas for mule deer include the rough breaks along the Pecos River such as Pierce and Cedar canyons, the Livingston Ridge area, Maroon Cliffs, Niminim Ridge, and the Caprock from Highway 62/180 north to the Chaves County line. These areas feature the greatest concentrations of mule deer throughout the east side of the resource area and often serve as isolated areas of critical habitat for mule deer.

The sandhill white-tailed deer is a remnant of the Texas white-tailed deer population and is found principally in the northeastern portion of the resource area. Historically, these deer ranged over all of the sand country east of the Pecos River. Their range has been greatly reduced and the population has declined to a few scattered animals (NMDGF digitized data, 1983).

Pronghorn Antelope

Pronghorn antelope are scattered throughout the planning area. However, three main areas, Eagle Creek-Feliz River, Indian Basin-Dagger Draw, and Burton Flats, house the greatest concentrations of pronghorn antelope. According to census data supplied by NMDGF, 500 to 1,000 antelope inhabit public lands in the Carlsbad Resource Area.

The Eagle Creek-Feliz River area is located within an "Antelope Habitat Study Area" of about 100,000 acres. The area was part of an antelope habitat study conducted by New Mexico State University beginning in 1978. Records in the 1940s document that the area was occupied by large numbers of antelope (approximately 3000). The area has been, and still is, a highly intensified sheep producing area. Since the 1940s, and up until 1978, antelope numbers were on the decline. Currently, some 769 pronghorn inhabit the study area as a result of BLM and NMDGF pronghorn cooperative reintroduction programs in 1978 and 1979.

Pronghorn antelope habitat located outside the Habitat Study Area is primarily grassy rolling uplands and shinnery oak sand dunes. The area is predominantly a cattle grazing area encompassed by barbed-wire fencing which allows antelope movement between pastures and allotments. Additionally, many of the areas inhabited by antelope have become major production fields for oil and gas over the past ten years. The resulting surface disturbance and constant operational travel and noise within these areas have redistributed or restricted antelope populations to areas of less disturbance. In many cases, these areas of less disturbance are without the necessary habitat features (e.g., water sources, adequate forb diversity, and cover) to sustain antelope on a year round basis. Seasonal fawning grounds generally remain unchanged year after year, but with the oil and gas development, seasonal fawning areas have had to move sporadically to avoid the prevailing surface disturbing activities. In addition, increased road densities within these areas have increased poaching.

UPLAND GAME BIRDS

Major species of upland game birds include mourning dove, scaled quail, bobwhite quail, andlesser prairie chickens, whose populations are distributed within suitable habitat throughout the resource area. Mourning dove populations peak during June and July, decline during August and early September, and are at the lowest point during the winter (Davis et. al. 1971). Annual migration through the area temporarily swells local populations from September through December, when concentrations can be found in grain fields located on private land, and around water sources.

Scaled quail inhabit the transition zone between grassland and shrubland habitats (Brown 1978), where annual precipitation averages only 8 to 16 inches. Numbers are highest in mesquite grasslands, followed by mixed desert shrublands and shinnery oak dunal areas. The most important factor limiting scaled quail is weather. They are so sensitive to moisture, or lack of it, that changes in precipitation seriously curtail breeding season success.

Bobwhite quail in the resource area predominantly occupy the shinnery oak mesquite sand dunes and riparian habitat sites. As with the scaled quail, Bobwhite numbers fluctuate due to severe winters or erratic rainfall or both. These conditions typify the northern and western fringes of bobwhite range in the United States (Kleberg Institute Report, April 1991). The Carlsbad Resource Area experiences both drought and occasional winters that are brutal by regional standards. It has been observed generally that populations associated with riparian zones remain stable throughout the year (CRA notes, 1988-1991).

Lesser prairie chickens are found in isolated areas east of the Pecos River in the sand shinnery oak habitat. The sparse pockets of habitat occupied by the prairie chicken in eastern New Mexico are subjected to a variety of changes (Haukos, 1988). These changes have occurred due to the use of the herbicide tebuthiron, the cumulative impacts from oil and gas development, and erratic rainfall.

Since 1985, seasonal surveys for prairie chicken "booming grounds" or leks have been conducted in the resource area to determine the status of populations within five townships of the sand shinnery oak community. Map 32 shows approximate locations of known leks. Based on those surveys, several determinations were made:

1) The number of "booming grounds" or leks located per year has decreased significantly since the mid-1980s (16 in 1985; 9 in 1986--only 3 survey days; 20 in 1987; 18 in 1988; 3 in 1989, 4 in 1990; 5 in 1991; 6 in 1992; and 6 in 1993);

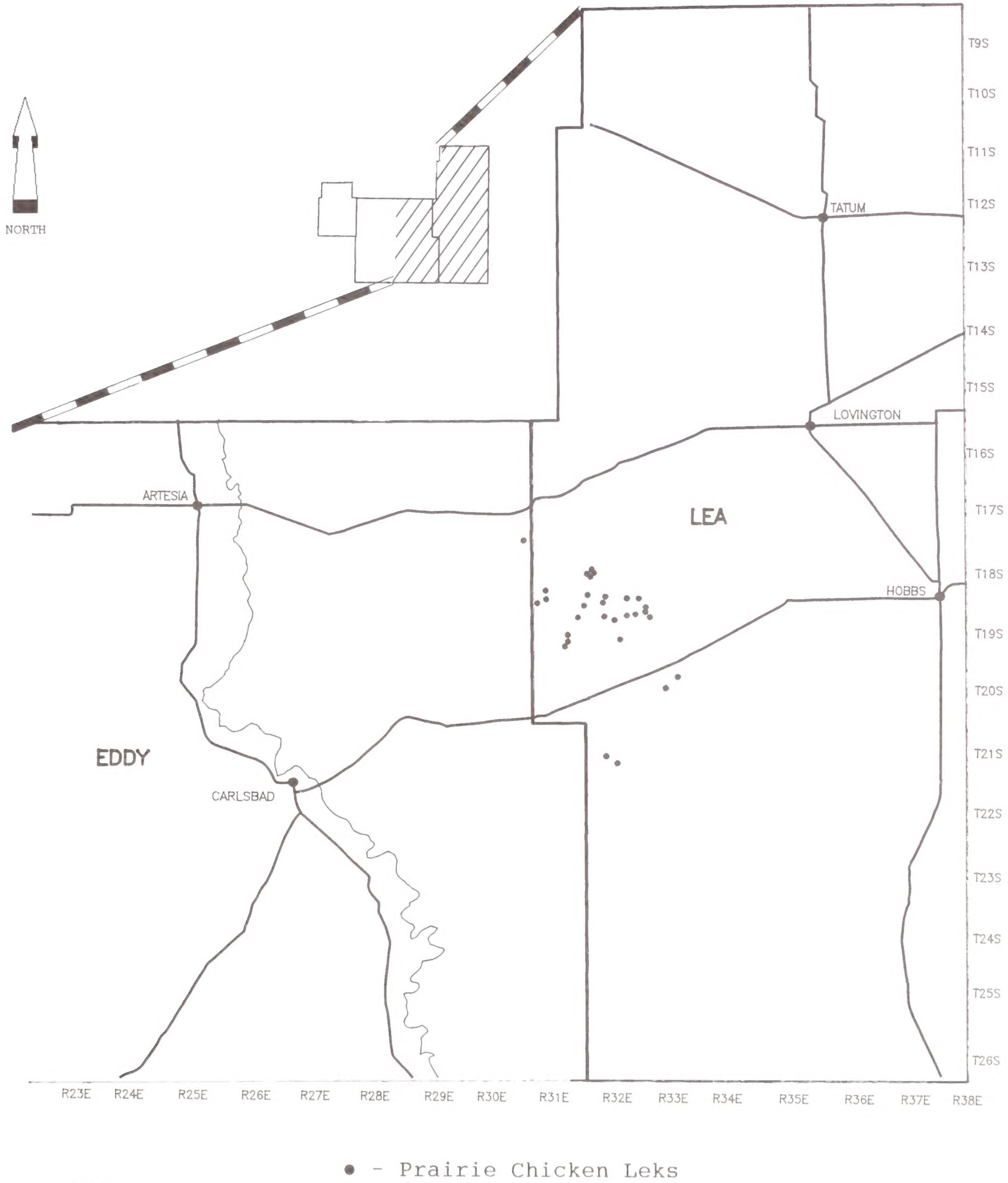
2) The average density of birds per lek has drastically declined from nine birds per lek in 1985 to 3.3 in 1991. These averages are based on nine sample sites for both years;

3) Booming ground locations are located a minimum of three-quarters of a mile away from drilling activities;

4) Noises ranging from 95 dB to 105 dB produced by pump jack motors operating on propane or other non-electrical sources have curtailed courtship interactions by interfering with the "booming" of the male lesser prairie chicken. In turn, females of the species cannot hear the booming males and do not arrive at the booming ground. In 1991, only one female of the species was observed during the seasonal survey within oil and gas production areas. As stated in a 1971 report from Memphis State University, "...suspected effects of noise on wildlife include (a) masking of signals that influence courtship, spacing, care of young, prey detection and escape, etc., and (b) direct effects on physiological and behavioral processes, including hearing loss and noise-induced stress responses. A lack of visible response by an animal does not necessarily imply adaptation or lack of effect.";

5) Expansion of oil and gas activity throughout the designated five-township habitat area has caused a portion of the population to move to adjacent areas to avoid the effects of oil and gas development;

6) The cumulative loss of habitat within occupied lesser prairie chicken range is a major limiting factor in the management of the population and to their overall population dynamics, in the Carlsbad Resource Area. Table 91 shows the total acreage of prairie chicken habitat disturbed by authorized ROW actions, per township.



SCALE
1/2" = 7.1 Miles
BLM-Roswell District, 1994

MAP 32
PRAIRIE CHICKEN LEKS
Carlsbad Resource Area

Pipelines, roads, power lines, etc., that are in trespass or were authorized under a sundry notice are not reflected on this table.

Table 92 depicts the total number of oil wells, gas wells, injection wells, abandoned oil and gas wells, and associated disturbed acreage in a four-township study area.

As suggested in the previous paragraphs regarding lesser prairie chicken habitat, the only viable management approach is to mitigate surface disturbance (i.e., require timing stipulations on drilling and exploration, muffled pump jack motors, protection of identified leks, etc.) as it occurs within prairie chicken habitat. There are an estimated 460,700 acres of potential prairie chicken habitat. The timing stipulation currently applies to 162,822 of these acres.

There currently are several isolated tracts of land without significant oil and gas development. These areas tend to be heavily used by all wildlife species, including prairie chickens. A majority of these tracts are outside the designated habitat area. There is now significant interest in developing many of these areas due to new information derived from geophysical exploration.

Many nongame species, which include raptors, small mammals, perching birds, reptiles, and amphibians, occur throughout the resource area. Southeastern New Mexico provides habitat for over 400 species of birds at some time during the year, whether for wintering range, breeding range or migration. Very high densities of breeding and wintering raptor populations and several species of colonial birds, namely, great blue herons, snowy egrets and black crowned night herons, breed in the planning unit.

Current information indicates that heater treater or separator facilities associated with oil and gas wells have become a significant impact to raptors, neotropical migratory birds and bat populations.

These species perch on or fly down vent pipes or stacks, and subsequently become incinerated due to lighting of the burner mechanism or asphyxiated due to poisonous gases exiting the vent stacks.

Although a few species of waterfowl are yearlong residents in the resource area, the majority of waterfowl species are migratory. All available acceptable surface water in the planning area is used by migrating waterfowl, but concentrations are found primarily in the Pecos River valley and on naturally occurring playas associated with the Pecos River drainage.

Fish populations are restricted to perennial water sources. Due to excessive siltation, shallow depth and frequent drawdowns, reservoirs along the Pecos River provide little quality game fish habitat, but abound with carp, suckers, and other rough fish species. However, Brantley Reservoir, which replaced McMillan reservoir in 1988, has increased the quality of game fish habitat substantially along the 14 mile portion of the Pecos River between the McMillan lake bed and Avalon Reservoir. The NMDGF stocks trout in the Pecos River below Brantley Dam on an annual basis. Some year-round fisheries habitat also exists on the Black River, a tributary of the Pecos River.

SPECIAL STATUS SPECIES

Animals

Federal- and state-listed threatened, endangered, and candidate animal species are listed in Appendix 16.

Plants

Federally listed threatened, endangered, and sensitive plants are managed throughout the Carlsbad Resource Area. A list of these threatened or endangered plant species and the habitats with which they are associated is presented in Appendix 16.

HABITAT IMPROVEMENTS

There are about 95 habitat improvement projects in the Carlsbad Resource Area (see Map 33). These are projects designed to enhance habitat for wildlife purposes. Most of the improvements are water projects.

TABLE 91
PRAIRIE CHICKEN HABITAT ON FEDERAL SURFACE AND/OR FEDERAL MINERAL ESTATE DISTURBED BY RIGHTS OF WAY ACTIVITY WITHIN 5 TOWNSHIPS
CARLSBAD RESOURCE AREA

Action	T. 18 S., R. 32 E.	T. 18 S., R. 33 E.	T. 19 S., R. 32 E	T. 19 S., R. 33 E.	T. 21 S., R. 32 E.
Rights-of-Way					
Elect. lines	76 ac. 31.3 mi.	44.1 ac. 18.2 mi.	60 ac. 21.4 mi.	35 ac. 14.5 mi.	0 0
Pipelines	575 ac. 118.5 mi	404 ac. 83.3 mi	770 ac. 159 mi	480 ac. 99 mi	280 ac. 57.7 mi
Roads	112 ac. 23.1 mi.	99.5 ac. 20.5 mi.	97 ac. 20 mi.	93 ac. 19 mi.	20 ac. 4.1 mi.
Total	763 ac.	547.6 ac.	927 ac.	608 ac.	300 ac.
Total	172.9 mi.	122 mi.	200.4 mi.	132.5 mi.	61.8 mi.

Note: This table was derived using the Resource Area Master Title Plats and Lease Maps.

TABLE 92
PRAIRIE CHICKEN HABITAT ON FEDERAL SURFACE AND/OR FEDERAL MINERAL ESTATE DISTURBED BY OIL AND GAS ACTIVITY WITHIN 4 TOWNSHIPS
CARLSBAD RESOURCE AREA

Well Type	T. 18 S., R. 32 E.	T. 18 S., R. 33 E.	T. 19 S., R. 32 E	T. 19 S., R. 33 E.
Oil Wells	125	182	62	33
Acres	(375)	(546)	(186)	(99)
Gas Wells	7	5	12	26
Acres	(21)	(15)	(36)	(78)
Inj. Wells	6	20	2	1
Acres	(18)	(60)	(6)	(3)
Aband. Oil & Gas Wells	28	27	30	10
Acres	(84)	(81)	(90)	(30)
Dry Holes	43	31	48	54
Acres	(129)	(93)	(144)	(162)
Temp. Aband. O&G Wells	5	4	1	0
Acres	(15)	(12)	(3)	(0)
Total Acres	(642)	(807)	(465)	(372)

Note: 1. The acres of disturbance are based on an average 3 acre well pad and associated operational facilities (e.g. reserve pits, roads) developed prior to 1992. 2. Numbers in parentheses are acres.

Source: Carlsbad Resource Area Master Title Plats and Lease Maps.

RAPTORS

The east side of the resource area contains an extremely dense and diverse group of raptor species. The factors contributing to the large populations are the diversity in prey species and the widespread distribution of nesting structure. The occurrence of 16 active raptor nests per 10-square-kilometer area has been documented over the past three years. This level of nesting activity makes the area second in the nation in the density of nesting raptors. Nests are generally located in a stable woody structure such as large mesquites, soapberry trees, hackberry trees or power poles, which provide protection from predators. Activity in these nest occurs from February to October. A maximum of 85 days for completion of nesting activities is typical for all species of raptors occurring in the resource area.

The west-side limestone hills area also provides habitat for a variety of raptor species such as Golden eagles, red-tailed hawks, great-horned owls and, occasionally, peregrine falcons.

Population densities in this portion of the resource area vary seasonally, and involve fewer species. However, rough cliff faces and steep canyon walls provide nesting structure for many species.

SPECIAL MANAGEMENT AREAS

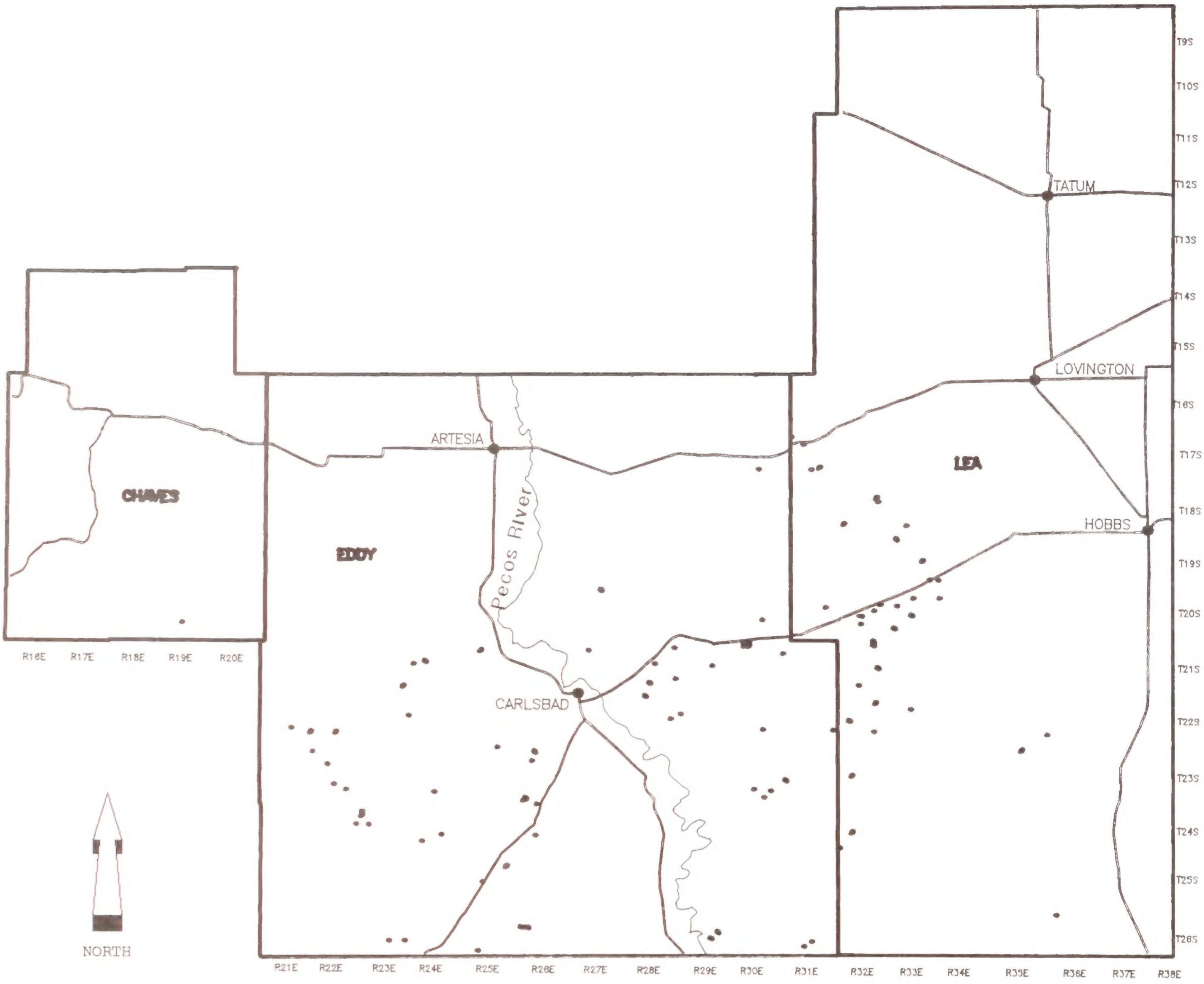
The South Texas Hill Canyon Research Natural Area (RNA) comprises approximately 1,360 acres on the east side of the Guadalupe Mountains about 30 miles west of Carlsbad. During the original RMP planning process for the Carlsbad Rresource Area, this area was designated a RNA as an excellent example of the Chihuahuan Desert Mountain ecosystem. The objective of this RNA is to manage, protect, conduct research and acquire knowledge about this unique representative of the ecosystem.

The East Guadalupe Escarpment Habitat Management Area (HMA) is located along the escarpment from State Highway 137 northwest to Texas Hill. The HMA totals approximately 25,000 acres and encompasses the South Texas Hill RNA. The entire HMA is dissected by numerous steep, rugged canyons. This area has been the target area since 1987 for wildlife habitat improvements such as wildlife watering units and prescribed burns. These projects were funded through the Sikes Act Habitat Improvement Program, and are a direct investment of the hunters and fishing enthusiasts of New Mexico. To date, there have been 13 wildlife watering units constructed and 25,000 acres treated with prescribed fire. Numerous other habitat improvements are planned.

Pecos River Canyons Complex was designated an ACEC in the Carlsbad RMP due to its riparian values and the uniqueness of the steep, red-bluff canyons associated with the Pecos River corridor. Recently, a population of Tharps Bluestar (*Amsonia tharpii*), a candidate (C1) for federal listing was located in the ACEC. The majority of the population is found on state surface, but a portion of the population is on BLM-managed lands.

The Maroon Cliffs area was designated a Cultural Resource Management Area (CRMA) in the 1988 Carlsbad RMP. In addition to the unique archeological resources of the area, a dense population of mule deer occupy the area on a year round basis. The rough topographic features, the distribution of water sources and the availability of browse provide excellent mule deer habitat. Oil and gas development has affected much of the area to the south, west and east of the CRMA, and there is great potential for development to the north. Increased protection throughout this area would enhance the vigor and distribution of the mule deer herd.

● - Habitat Improvement



SCALE
1/2" = 9.5 Miles
BLM-Roswell District, 1994

MAP 33
WILDLIFE HABITAT IMPROVEMENTS LOCATIONS
Carlsbad Resource Area

ROSWELL RESOURCE AREA

INTRODUCTION

Environmental components that would not be affected or that are not important to the resolution of planning issues or analysis of alternatives are not covered in detail. Two critical elements defined in BLM manual guidance, prime or unique farm land and Native American religious concerns, have been determined to be unaffected by the actions analyzed in this document.

MINERAL RESOURCES

LEASABLE MINERALS

Oil and Gas

Oil and gas resources in the Roswell Resource Area are discussed at the beginning of this chapter.

Coal

In 1884, coal was discovered about two miles northwest of the present town of Capitan, Lincoln County, New Mexico. Mining there, from 1900 through 1905, produced more than 600,000 tons of coal. Production of coal declined but continued to supply local demand on a small scale until 1910.

NON-ENERGY LEASABLE MINERALS

Potash

The potash-bearing Salado formation covers about 1,870 square miles of the west-central Permian Basin (Adams, 1970). The Salado Formation is as much as 2,300 feet thick and consists of flat-lying beds composed of halite, muddy halite, anhydrite, polyhalite, dolomite, and mudstone.

Coal mines, such as the Oscura Coal Mine in Three Rivers/Oscura coal field, were common in Lincoln County at the turn of the century.

The northwestern part of the Salado Formation falls within the southeastern corner of Chaves County. The thickness of the Salado Formation in Chaves County thins northward from the southern boundary of the resource area, from 660 feet to zero over an area of approximately 300 square miles (File and Northrop, 1966; Lowenstein, 1988; Austin and Barker, 1990). Due to their southeast dip, potash-bearing beds probably are closer to the surface or probably have been dissolved to the north and west.

While economically important potash deposits are found in the Salado formation near Carlsbad, the part of the potash facies of the Salado Formation which is located in Chaves County is not as thick as that found in the Carlsbad potash district, where the thickness ranges from 650 feet to 1300 feet. It is possible that the evaporite deposits in the Roswell Resource Area are of similar economic grade to those in the Carlsbad area, although the thicknesses of the potash beds in the Roswell Resource Area may be the factor that determines whether the resource will become economic in the near future. An estimate of the volume of potash in the Roswell Resource Area is 1.9 billion metric tons (Bartsch-Winkler, Williams-Stroud, 1992 USGS Open-File Report 92-0261).

Sulfur

In the Roswell Resource Area, many occurrences of native sulfur associated with anhydrite have been reported (Talmage and Wooton, 1937; Hinds and Cunningham, 1970; Smith, 1978; Thomsen, 1990) and many other occurrences have been noted in drill cuttings and cores. Except for sulfur recovered as a by-product of oil and gas production, no sulfur has been produced or is being mined in the resource area. But, exploration is continuing east of Roswell and around Santa Rosa and Fort Sumner. Near the resource area's southern boundary, northwest of Artesia (sec. 8, T. 16 S., R. 22 E.), a 20 foot-thick sulfur bed of high purity was encountered at 940 feet (Talmage and Wooton, 1937). Sulfur occurrences in gypsum also are reported from near White Oaks (Jones, 1915; Talmage and Wooton, 1937).

In the resource area, the region of high potential for native sulfur deposits may be outlined by superimposing the areas of high oil, gas, or tar sand potential upon the area underlain by anhydrite deposits (see Map 34).

LOCATABLE MINERALS

Valuable deposits of reserved federal minerals are subject to mining claim location under the "General Mining Law" of 1872, as amended, and other mining laws of the United States. Gold, silver, copper, lead, and zinc are some of the metallic mineral commodities that are open to mining claim location, as are nonmetallic minerals including barite, fluorspar, and gypsum. Also, mineral materials with special, unique, or unusual characteristics may be classed as locatable. For example, metallurgical-grade limestone used because of its chemical composition is considered a locatable mineral.

The Roswell Resource Area has produced significant quantities of copper, gold, fluorite, gypsum, iron, lead, molybdenum and silver, as well as small quantities of manganese, rare-earth elements, tungsten, uranium and vanadium.

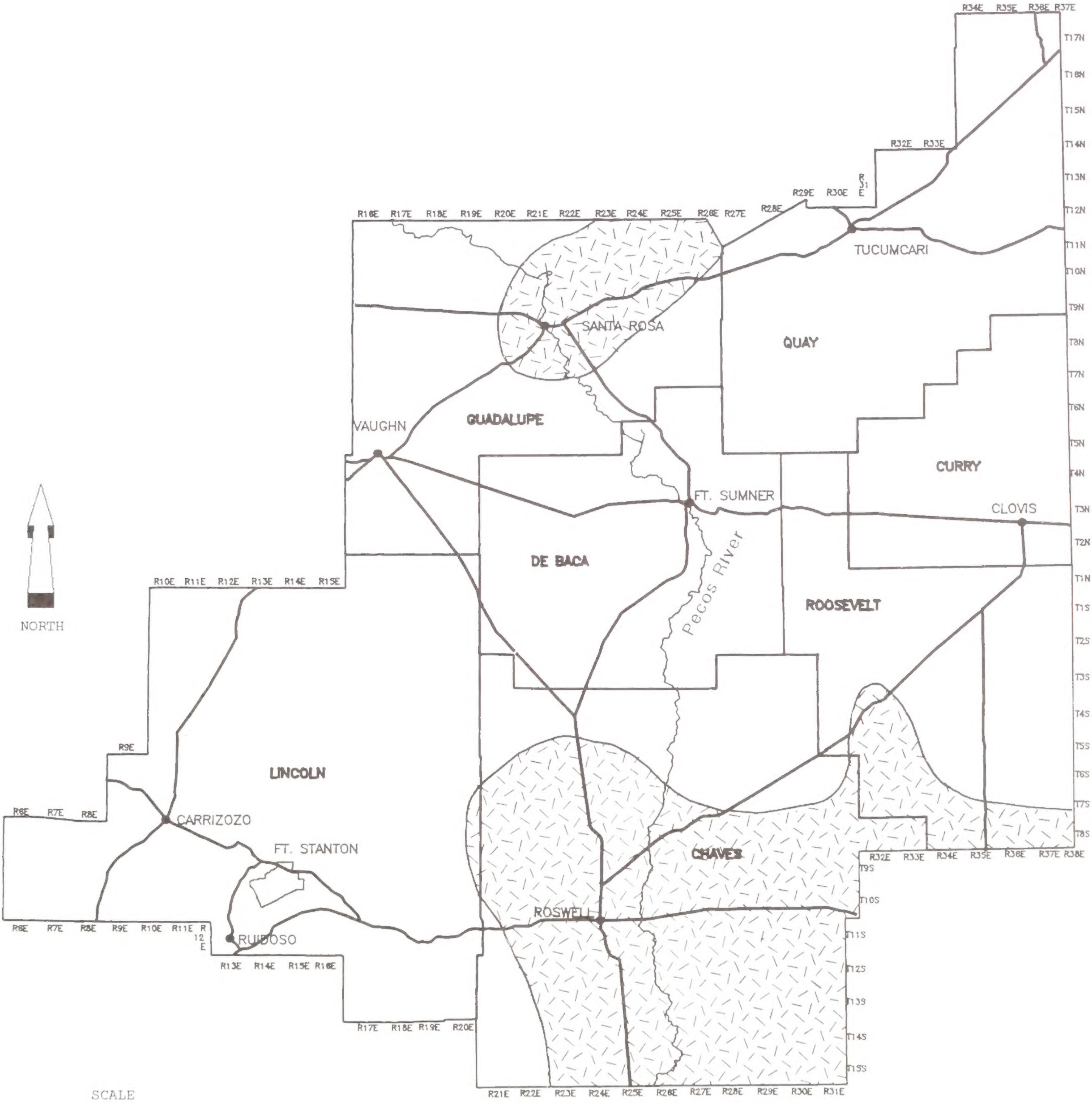
Inferred, high-purity gypsum resources are present in Lower and Upper Permian rocks east of Roswell.

Approximately 5.05 billion tons are estimated to occur in areas along the Pecos River (Summary of The Mineral- and Energy-Resource Endowment, BLM Roswell Resource Area, East-Central New Mexico, S.Bartsch-Winkler and others, 1993).

As of February 18, 1992, there were about 5,000 active mining claims in the Roswell Resource Area. Table 93 summarizes the mining claims by county, type and status.

Seven mining districts within Lincoln County occur in the planning area. These districts are the Nogal, White Oaks, Jicarilla, Tecolote, Red Cloud (Gallinas), Oscura, and Capitan Mountains. Four of these districts, the Nogal, Capitan, Jicarilla, and Red Cloud, are exclusively in the boundaries of the Lincoln or Cibola National Forests. The Oscura mining district is within the White Sands Missile Range. The White Oaks and Tecolote mining districts include BLM-managed lands, private surface-federal minerals, private land, and U.S. Forest Service lands.

▨ High Potential Sulfur Areas


NORTH
QUAY
TUCUMCARI
SANTA ROSA
GUADALUPE
VAUGHN
CURRY
FT. SUMNER
CLOVIS
DE BACA
Pecos River
ROOSEVELT
LINCOLN
CARRIZOZO
FT. STANTON
CHAVES
ROSWELL
RUIDOSO
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E R32E R33E R34E R35E R36E R37E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
R10E R11E R12E R13E R14E R15E
R9E
R8E R7E R8E
R8E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 34
SULFUR OCCURRENCE
Roswell Resource Area

TABLE 93
MINING CLAIM SUMMARY BY COUNTY, TYPE AND STATUS
ROSWELL RESOURCE AREA

	Claim Type							
	Lode		Placer		Mill Site		Tunnel Site	
County	Active	Closed	Active	Closed	Active	Closed	Active	Closed
Chaves	186	562	6	1,109	0	0	0	0
De Baca	9	39	6	0	0	0	0	0
Guadalupe	80	3	0	0	0	0	0	0
Lincoln	4,317	391	3,742	604	5	15	0	0
Curry	0	0	0	0	0	0	0	0
Quay	0	0	0	0	0	0	0	0
Roosevelt	0	0	0	0	0	0	0	0
Totals	4,592	995	3,754	1,713	5	15	0	0

Source: BLM files, 1994.

SALABLE MINERALS

Salable minerals are those common variety mineral materials segregated out of the locatable minerals category by the Act of July 23, 1955, Public Law 167 (69 Stat. 367, 30 U.S.C. 601). Salable mineral materials include, but are not limited to, common varieties of sand, stone, gravel, pumice, pumicite, cinders, petrified wood, common clay, fill material, caliche, and blow sand.

In the Roswell Resource Area, the occurrence and type of mineral materials varies with surface geology and topography. The potential for mineral materials and the variety of mineral materials in the resource area varies with location. The entire resource area has high potential for most types of mineral materials.

The supply of aggregate is plentiful in the eastern portion of the resource area on the Llano Estacado, Mescalero Plain, Pecos and Canadian river terraces, and parts of the Pecos Slope. Road-building materials in the resource area include sand and gravel, caliche, basalt, diorite, sandstone and limestone (New Mexico State Highway Department 1961; 1966; 1971-72).

LANDS, REALTY AND RIGHTS-OF-WAY

LANDS

The Roswell Resource Area contains about 1.5 million acres of public land in Quay, Guadalupe, Curry, DeBaca, Roosevelt, Lincoln, and Chaves counties. The Roswell Resource Area boundary follows county lines, except for southwest Chaves County. Public land makes up about 10.6 percent of the total surface ownership. The better blocked public lands occur in Chaves and Lincoln counties.

Map 1, in the back map pocket, depicts the surface ownership of the resource area. Table 94 summarizes the land ownership in the resource area.

SALES

Sales of public land can occur under the disposal criteria in Section 203 of the Federal Land Policy and Management Act (FLPMA). Public lands suitable for sale are offered by the BLM. The lands are sold at not less than fair market value. Public lands classified, withdrawn, reserved or otherwise designated as not available or subject to sale, are unavailable for sale.

TABLE 94
ESTIMATES OF SURFACE LAND OWNERSHIP
ROSWELL RESOURCE AREA

	Acres
Federal:	
BLM	1,489,000
U.S. Forest Service	411,000
Military	188,000
U. S. Fish & Wildlife Service	23,000
U.S. Bureau of Reclamation	8,400
Other	3,600
State	2,784,000
Private	13,961,400
Total	13,868,400

Note: Figures rounded. "Other" includes other federal agency lands.

Source: BLM Geographic Information System, 1992.

EXCHANGES

Exchanges are managed under the disposal criteria in Section 206 of FLPMA. Exchanges occur in direct response to public demand or by BLM initiative to improve management of the public lands and resources. The preference of the BLM is to dispose of lands by exchange.

RECREATION AND PUBLIC PURPOSE

Public needs or demands may lead state, county, or local governments, or qualified organizations, to apply for public lands for specific uses under the Recreation and Public Purpose (R&PP) Act.

Examples of those uses include parks, playgrounds, cemeteries, and historical monuments.

Because of the potential liability to the United States, the BLM closed the landfills leased under the R&PP Act. Transfer of public land for new landfill sites for solid waste disposal occurs through alternative means. These include sale or exchange under sections 203 or 206 of FLPMA, with no reversionary provision to the BLM.

WITHDRAWALS

Withdrawals are formal actions that set aside, withhold, or reserve federal land by statute or administrative order for public purposes. The FLPMA mandates a withdrawal review program. The BLM has the responsibility of aggressively seeking an end to all unnecessary withdrawals and classifications. Appendix 6 describes the lands withdrawn and the purpose of each withdrawal.

Presently, there is only one withdrawal for water power purposes (NM 52344) in the Roswell Resource Area. A recommendation has been made to terminate the withdrawal due to the lack of water power values and because the lands have been transferred to private ownership.

LAND USE AUTHORIZATIONS

Rights-of-way grants have been issued under Title V of FLPMA in response to public demand. Table 95 shows the number of rights-of-way authorizations and the approximate acreages involved over the past ten years.

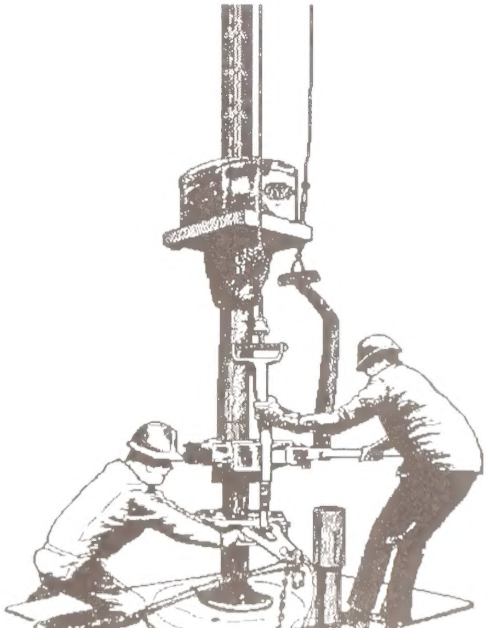


TABLE 95
RIGHTS-OF-WAY AUTHORIZATIONS
ROSWELL RESOURCE AREA

Type	Number of Authorizations	Acres
Powerlines	96	5,470.615
Roads	272	907.972
Oil & Gas Pipelines	842	7,291.310
Pipeline Facilities	22	57.557
Water Pipelines	27	3,061.215
Water Facilities	21	6,301.561
Telephone Lines	60	613.004
Communication	47	2,254.791
Total	1,387	25,958.025

Source: BLM Automated Lands and Minerals Record System, 1992.

RANGELAND RESOURCES

LIVESTOCK GRAZING

There are 414 grazing allotments in the Roswell Resource Area, with 329,370 animal unit months (AUMs) of permitted grazing use. Of the nearly 1.5 millon acres of public land in the resource area, less than one percent is unsuitable for livestock grazing.

There are 45 allotments in the resource area that have Allotment Management Plans (AMPs). There are 24 allotments with AMPs in the East Chaves Grazing EIS area and 21 in the West Roswell EIS area. Activity plans, which include grazing systems, are being proposed on an additional 65 allotments.

ENVIRONMENTAL ANALYSES

The East Roswell Grazing Environmental Impact Statement (1979) and the Roswell Resource Area Management Framework Plan/Environmental Impact Statement (1984) address livestock grazing in the Roswell Resource Area.

Since the completion of the East Roswell Grazing EIS, 140 storage tanks and drinking troughs, 138.6 miles of pipeline, two dirt tanks, 129.5 miles of fence, and 31 erosion control structures have been constructed. Additionally, 55,684 acres of shinnery, 25,760 acres of mesquite, and 6,535 acres of broomweed have been treated with chemicals. An additional 495 acres of brush control by prescribed burning was completed, as well. All of the 101 allotments covered by the East Chaves Grazing EIS have been categorized. Ninety-nine permittees or lessees have accepted adjustment or remain at their preference numbers. Activity plans for these allotments are not planned at this time.

The 315 grazing allotments covered by the Roswell Resource Area Management Framework Plan/Environmental Impact Statement completed in 1984 are located in west Chaves, Lincoln, Guadalupe, Quay, Curry, Roosevelt and DeBaca counties. All of these allotments were categorized and decisions issued. Under this plan, four wells (with pump or windmill), 58 storage tanks and drinking troughs, 57 miles of pipeline, 54.4 miles of fence and one dike (erosion control structure) have been constructed. Additionally, 1,200 acres of creosote and 1,200 acres of snakeweed were treated with chemicals, and 1,450 of brush was treated by burning.

Desert vegetation complements bare rock at the Carrizozo lava flow.

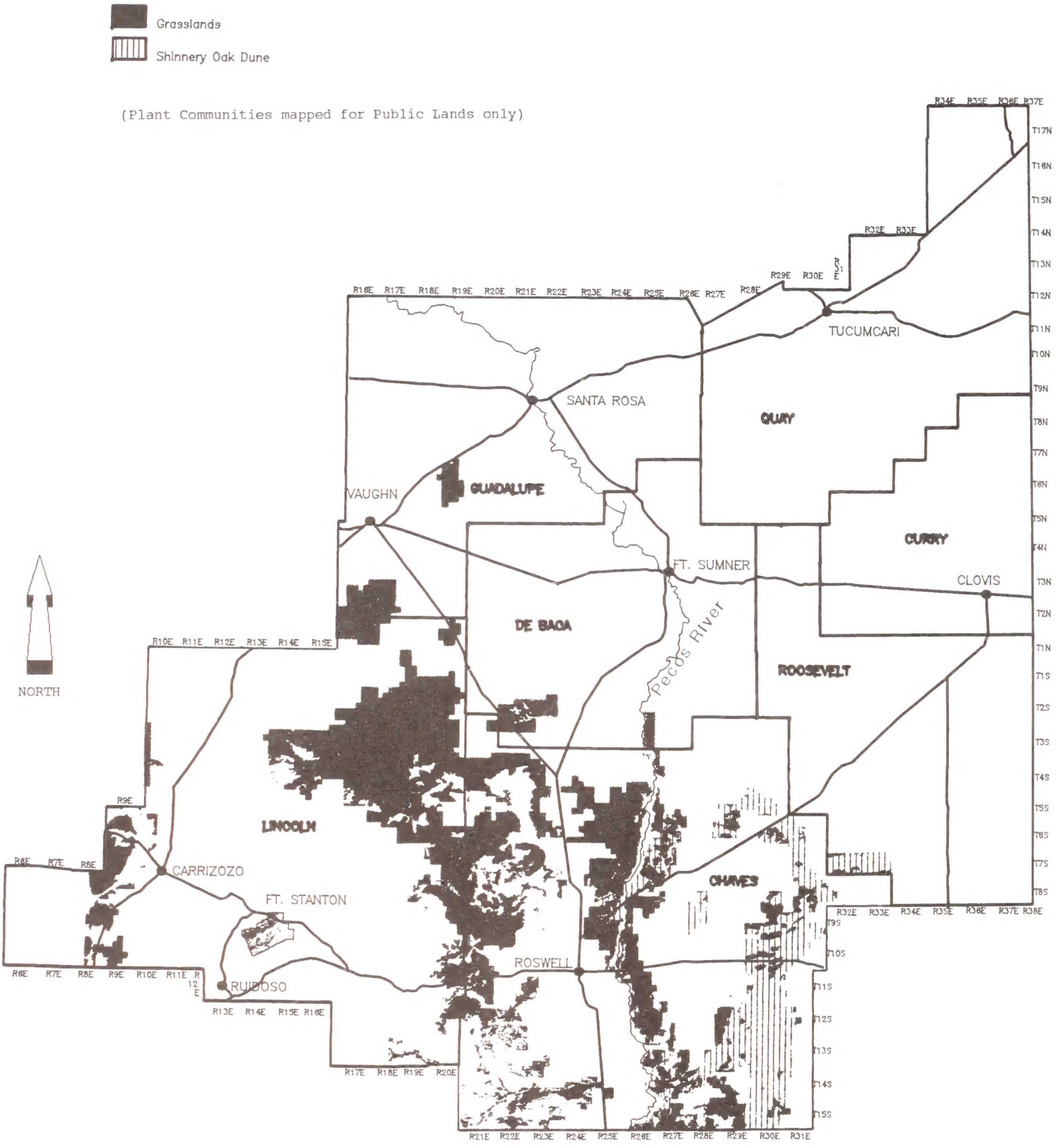
VEGETATION

The resource area has 57 inventoried range sites which have been combined into 7 community types. The community types were combined based on similar soils, topography, dominant vegetation, and responses to management action. See Appendix 11 for the community types and the range sites they contain.

The seven community types are drainages/draws/canyons, shinnery oak-dune, grasslands, pinon/juniper, mixed desert shrub, riparian, and mixed shrub malpais. Riparian areas and playas may occur within any or all of these community types. Maps 35 and 36 display six of the community types. The riparian community type areas are generally small and are, therefore, difficult to map. Table 96 describes existing ecological conditions using seral stage terminology. After completion of the RMP, ecological conditions could be described in terms of meeting the desired plant community (DPC). This change will facilitate a more comprehensive measurement of progress towards a variety of vegetative goals including wildlife, livestock and watershed needs.

VEGETATION TREATMENTS

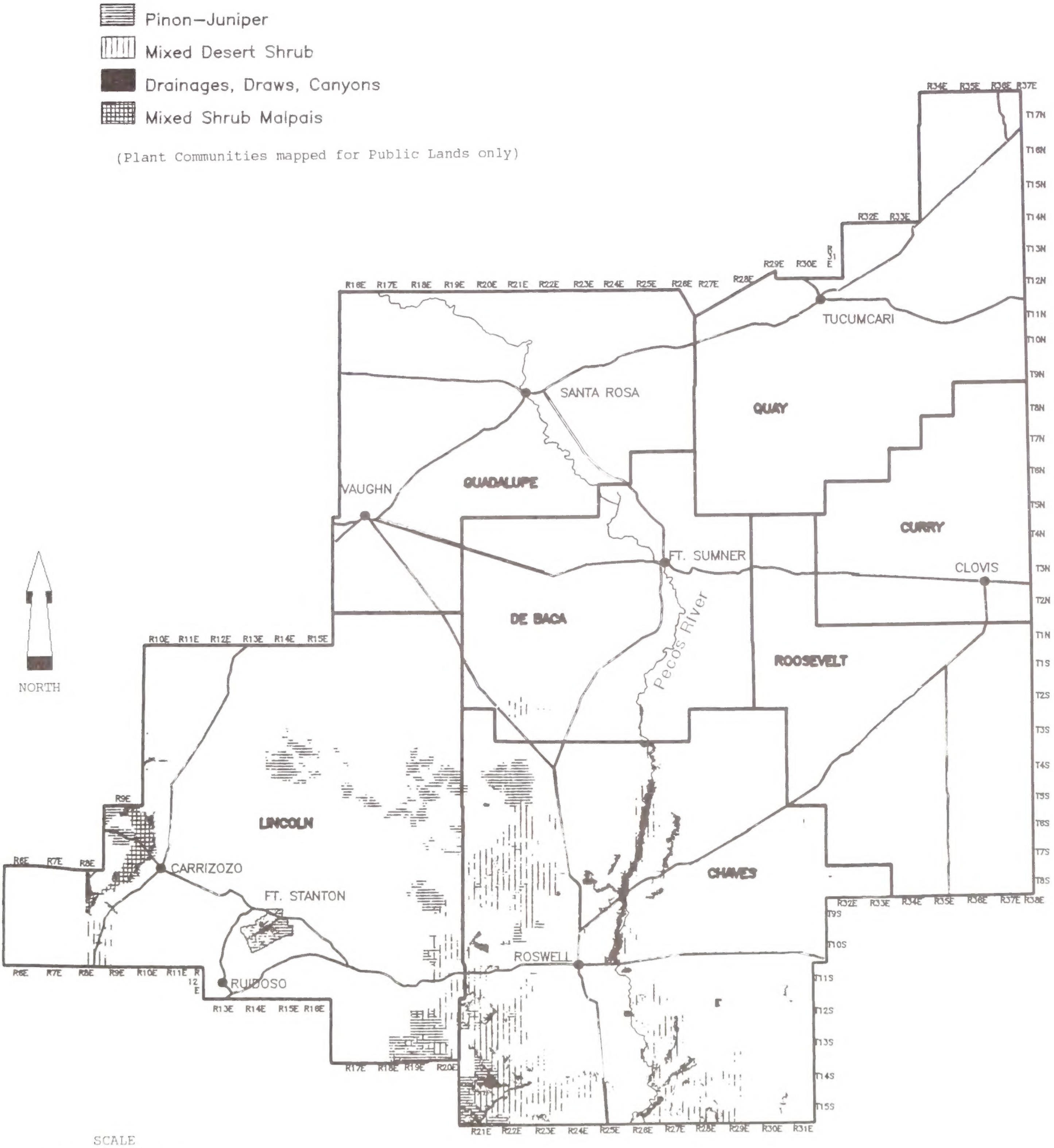
A goal of vegetation management in the Roswell Resource Area is to limit the proliferation of a variety of plant species that out-compete other valuable species, such as grasses and forbs, that provide important wildlife, livestock and watershed values, or that are potentially poisonous to livestock or wildlife. Depending on site-specific resource conditions, primary targets of vegetation management are noxious species, mesquite, creosote and tarbush shrubs, shinnery oak, broom snakeweed, cholla cactus, juniper trees and



(Plant Communities mapped for Public Lands only)

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 35
PLANT COMMUNITIES
Roswell Resource Area


▤ Pinon–Juniper
▥ Mixed Desert Shrub
■ Drainages, Draws, Canyons
▦ Mixed Shrub Malpais
NORTH
SANTA ROSA
TUCUMCARI
QUAY
GUADALUPE
VAUGHN
CURRY
FT. SUMNER
CLOVIS
DE BACA
Pecos River
ROOSEVELT
LINCOLN
CARRIZOZO
FT. STANTON
CHAVES
ROSWELL
RUIDOSO
R34E R35E R36E R37E
R32E R33E
R29E R30E R31E
R28E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E
R10E R11E R12E R13E R14E R15E
R9E
R6E R7E R8E
R6E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S
T9S T10S T11S T12S T13S T14S T15S

(Plant Communities mapped for Public Lands only)

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 36

PLANT COMMUNITIES

Roswell Resource Area

TABLE 96
ESTIMATED ECOLOGICAL CONDITION BY PLANT COMMUNITY TYPE
ROSWELL RESOURCE AREA

Community Type	Seral Stage, in Acres				
	Early	Mid	Late	Excellent/Climax	Undetermined
Riparian/Wetland[1/]					
Drainages/Draws/Canyons	511	12,144	15,030	4,048	31,733
Shinnery Oak/Dune	6,843	209,796	63,145	0	279,784
Grasslands	4,875	264,038	556,811	40,683	866,415
Pinon/Juniper	2,501	71,727	42,549	1,106	117,883
Mixed Desert Shrub	3,326	110,076	127,796	4,920	246,118
Mixed Shrub Malpais	0	4,305	6,097	0	10,402
Total Public Acres	18,056	672,086	811,428	50,757	1,552,335

[1/] Data not available.

Source: BLM files, 1994.

exotic species such as Russian olive and tamarisk (salt cedar).

Russian olive, tamarisk and other exotic species are controlled to allow native vegetation to return to the landscape. Tamarisk also is a species of concern due to its phreatophytic characteristics. The state of New Mexico has not officially designated any plant species as noxious. Nevertheless, the RoswellResource Area has a number of plants that are potentially poisonous to livestock and wildlife. Although livestock losses are not common on ranges with abundant forage, extended dry periods or ranges in poor condition (early seral stage) may force livestock to graze poisonous plants.

MATHERS RESEARCH NATURAL AREA (RNA)

The Mathers RNA is a 241.54 acre area set aside for the study of the shinnery oak-bluestem vegetative type. Currently, 91 acres of the RNA are fenced to exclude livestock grazing.

CULTURAL RESOURCES

The earliest inhabitants, Paleoindians, first entered this area approximately 12,000 years ago. The Paleoindian adaptation to the environment ended approximately 7,000 years ago as a result of climate change. There are approximately 80 sites in the Roswell Resource Area that contain artifacts dating to the Paleoindian period.

The term Archaic is used to describe a lifestyle that began approximately 7,000 years ago, near the end found throughout the Roswell Resource Area. There are approximately 230 sites in the resource area that contain artifacts dating to the archaic period.

The ceramic period describes a technological innovation which began between A.D. 600 and A.D. 900. The archaeological sites exhibiting ceramics are found over much of the Roswell Resource Area. The ceramic sites associated with architecture are found along the major stream and river drainages, including the Pecos, Hondo, Bonito and Ruidoso rivers. There are approximately 875 sites in the resource area that contain artifacts dating to the ceramic period.

The last era in the prehistoric sequence is called the Protohistoric. This time period began some time before A.D. 1400 as agriculturalists abandoned what is now the Roswell District. The area came to be inhabited primarily by nomadic peoples who possessed a material culture that has left few remains. It is very difficult to identify archaeological sites belonging to the Protohistoric era. The Protohistoric period began to close sometime around the early 1800s after increased contact with Europeans altered Native American lifestyles.

The first Mexicans to occupy lands in the Roswell Resource Area came from the Rio Grande Valley in the early 1820s and were subsistence farmers and herdsmen. During the early part of the 19th century, lands currently in the resource area were still part of the territory used by the Comanche and Apache. The Hispanics enjoyed a reasonably peaceful relationship with the Comanche and trade between the two groups contributing greatly to keeping the peace. The Apache, on the other hand, raided the Mexican settlers, as well as Pueblo Indian settlements. In 1848, the Treaty of Guadalupe-Hidalgo between the U.S. and Mexico established New Mexico as an American territory. In 1855, Fort Stanton was established on the Rio Bonito. The military presence helped deter conflicts with the Indians and allowed an economy to develop based on currency for goods. The American Civil War destabilized the region. Fort Stanton was abandoned to the Confederates in 1861, and the Mescalero Apache resumed raiding. In 1862, with the defeat of the Confederate Army in the area, the U.S. Government sent Kit Carson and five companies of volunteers to reoccupy Fort Stanton and to subdue the Apaches.

With the end of the Civil War in 1865, more Anglo Settlers moved into the area now comprising the resource area. In 1866, two enterprising ranchers named Loving and Goodnight decided to drive their cattle herds to a new market in Colorado. The route went west from Texas to the Pecos River Valley, then north along the Pecos River to Colorado. In 1867, John Chisum settled in the Pecos Valley. As the river drainages became more settled, friction was

Archeologists excavate sites to recover important archeological data.

created between the farmers, cattle ranchers and sheep ranchers. In 1878, a notable conflict that took place between two rival merchants became known as the Lincoln County War. William Bonney (Billy the Kid) sided with the McSween-Tunstall faction against the Murphy-Dolan group.

The military at Fort Stanton was preoccupied with keeping the peace in the area when Victorio, a Mescalero chief, returned to lead a band of Apache followers on raids in southern New Mexico and into Mexico. In 1881, Victorio was killed, and soon afterwards, the Mescalero Apaches stayed on their present-day reservation.

By 1889, the era of the cattle empires was over, due to drought. The Homestead Act and the Desert Land Act contributed to the gradual increase of settlers in the area.

In the 1920s, oil well drilling began in the resource area. Oil and gas development continue to bring temporary prosperity to the area.

In 1947, an unidentified flying object allegedly crashed in the area, reportedly leaving debris and even alien bodies. This crash is supposed to be among the very best documented U.F.O. sightings anywhere.

There are approximately 400 sites in the resource area that contain artifacts dating to the historic period.

PALEONTOLOGICAL/GEOLOGICAL RESOURCES

Geological formations exposed in the Roswell Resource Area represent a wide spectrum of geological time and biological evolution (Map 37 and Figures 2 and 3). Although the areal extent of some of these fossil-bearing strata is quite large, only a limited number of paleontological evaluations have been recorded. Formations exposed in the Roswell Resource Area include:

Permian period
- Abo Formation
- San Andres Formation
- Artesia Group

Triassic period
- Chinle Shale - Redonda Formation
- Cuervo Sandstone Member - Santa Rosa Formation

Cretaceous period
- Mesa Verde Formation

Pliocene epoch
- Ogalala Formation

Quaternary period
- Gatuna Formation - Pecos Valley
- Tahoka, Double Lakes, Blackwater Draw Formations (High Plains)
- Eolian sand, loess, colluvium

EXPLANATION

☐ CENOZOIC ROCKS
Sedimentary rocks: Includes alluvium and gravel, colluvium, loess, dune, pediment, and terrace deposits (Quaternary); basalt flows (Quaternary; high-terrace gravel and pediment deposits, including Pleistocene Gatuna Formation (Pecos River valley) and Blackwater Draw, Double Lakes, and Tahoka Formations (Llano Estacado)(Quaternary); intermountain gravel of northern Tularosa Valley (Quaternary and Tertiary); Ogallala Formation (Tertiary); Cub Mountain Formation (Tertiary and Upper Cretaceous)

■ Intrusive and volcanic rocks: Includes calc-alkalic and alkalic intrusive stocks and laccoliths (Tertiary); volcanic flows, Sierra Blanca Igneous Complex

░ MESOZOIC ROCKS
Sedimentary rocks: Includes Mesaverde Formation, Mancos Shale, and Dakota(?) Sandstone, undivided (Upper Cretaceous); Cretaceous and Triassic rocks, undivided, including the Pajarito Shale, Mesa Rica Sandstone, and Tucumcari Shale (Lower Cretaceous) and Redonda Formation (Upper Triassic) east of long 104°15' N. and north of lat 34° N.; Morrison Formation (Upper Jurassic); Exeter Sandstone (Middle Jurassic); Morrison Formation and Exeter Sandstone, undivided, east of long 105° W. and north of lat 34°45' N.; Chinle Formation (Upper Triassic); Santa Rosa Sandstone (Upper Triassic); Chinle Formation and Santa Rosa Sandstone, undivided, on upthrown side of Bonita fault on the Canadian River; Mesozoic rocks including Cretaceous, Jurassic, and Triassic rocks, on downthrown side of Bonita fault on the Canadian River

▒ PALEOZOIC ROCKS
Sedimentary rocks:
Permian rocks: --Includes Dewey Lake, Rustler, and Salado Formations (Upper Permian) in the southernmost Pecos River valley; Artesia Group (Upper Permian) including the Tansill, Yates, Seven Rivers, Queen, and Grayburg Formations; San Andres Formation and Glorieta Sandstone (Lower Permian), where the San Andres includes Fourmile Draw, Bonney Canyon, and Rio Bonito Members; Lower Permian rocks, including the Yeso, Abo, Hueco, and Bursum(?) Formations
Pre-Permian rocks: --Includes Pennsylvanian rocks, west of long 106° W.; Mississippian through Cambrian rocks, west of long 106 ° W.

▓ PRECAMBRIAN ROCKS
Granitic and metamorphic rocks: Precambrian rocks, west of long 106° W.

Contact

Fault --Dashed were approximately located; dotted where concealed. Bar and ball on downthrown side where relative movement known; opposed arrows show relative horizontal movement where known

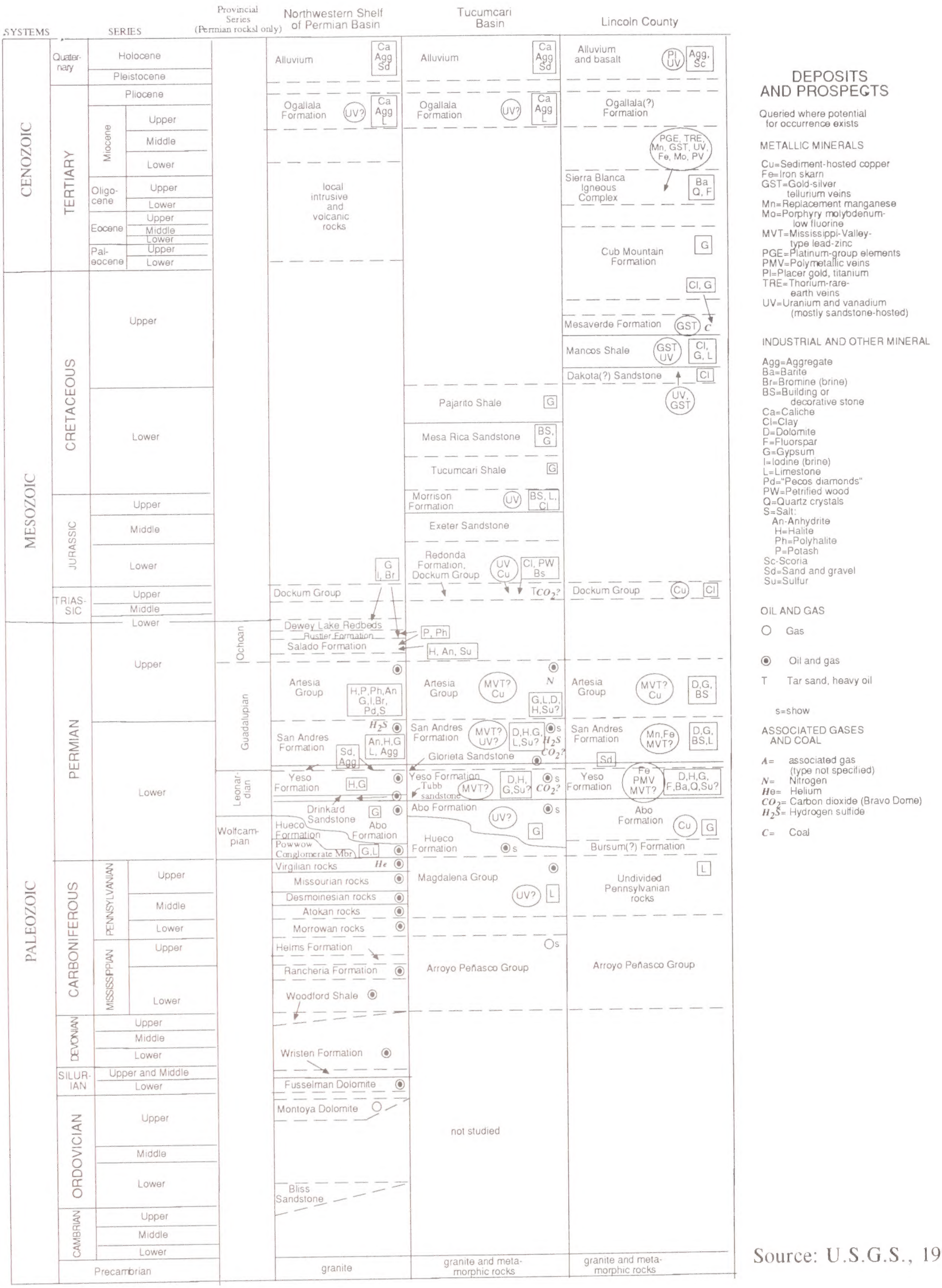
Dike--(Tertiary)

Sink--Collapse structure

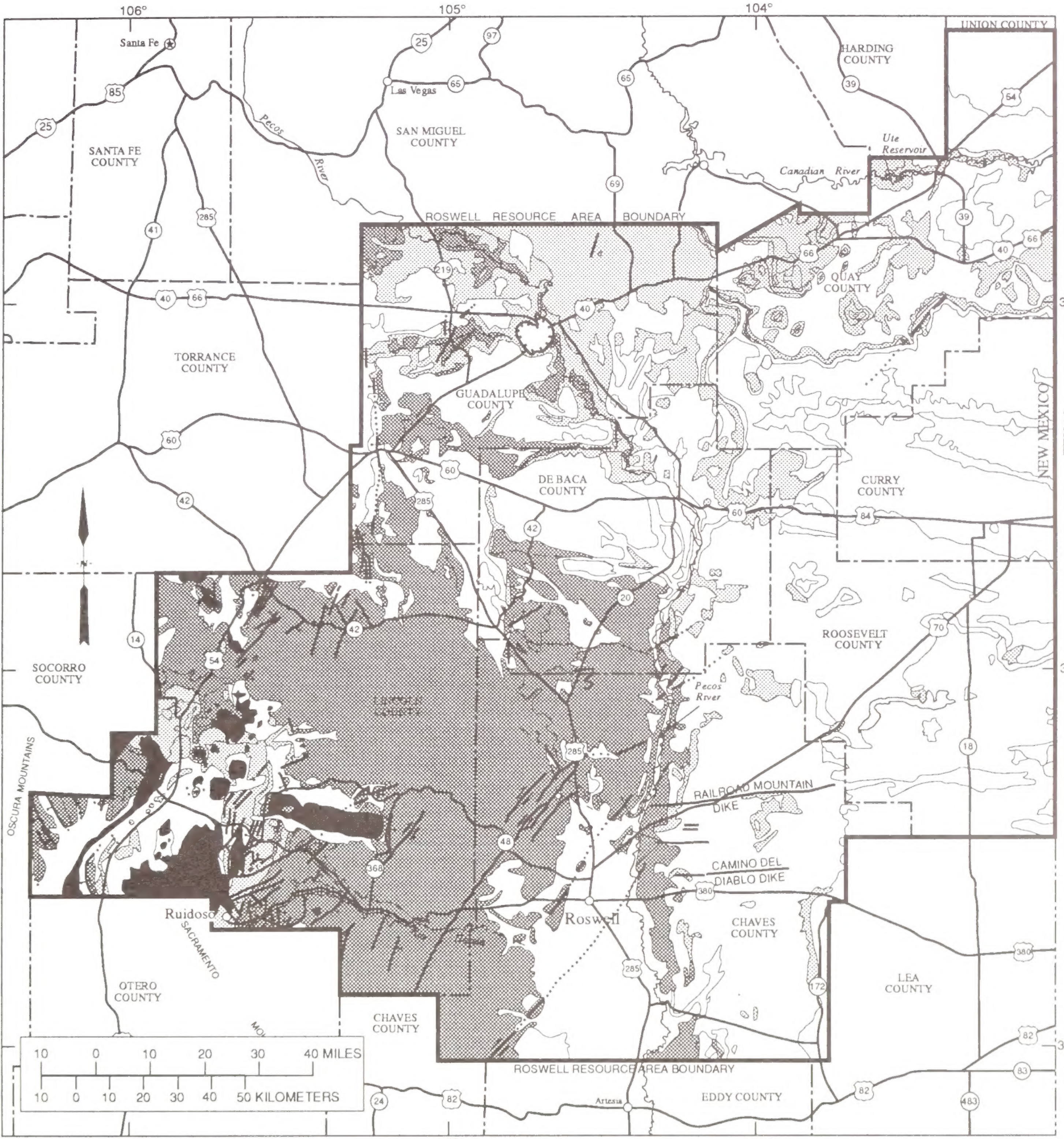
Generalized geologic map of the Roswell Resource Area, east-central New Mexico. Modified from New Mexico Geological Society, 1982.

FIGURE 2
EXPLANATION KEY FOR GEOLOGIC FORMATIONS

FIGURE 3
REGIONAL STRATIGRAPHIC COLUMN



Source: U.S.G.S., 1993



Source: USGS,1993

MAP 37

GEOLOGIC FORMATIONS

Roswell Resource Area

The Abo Formation is exposed in western Lincoln and Guadalupe counties. It has produced fossils of amphibians, reptiles and invertebrates and in some cases footprints and trackways.

Permian age invertebrate marine fossils are commonly found in the San Andres Limestone. The most common San Andres Limestone fossils in the resource area are snails, ammonoids, brachiopods, and clams, but other San Andres fossils, such as bryzoans and fusulinids, also are locally plentiful. The San Andres Limestone is exposed over much of the resource area west of Roswell, but occurrence of fossils is sporadic.

Fossil vertebrates from the Upper Triassic strata of east-central New Mexico have been known for nearly a century (Lucas, et al., 1985), and since 1983, field parties from the University of New Mexico have made an extensive collection of vertebrate, invertebrate, and plant fossils from these exposures. The presence of certain fossils in this collection provides evidence supporting the concept of a land connection between North America and the African continent during the Triassic period. Fossils from this group include fish, amphibians, and dinosaurs. Triassic rocks are widely exposed in Guadalupe and Quay counties and along the Pecos River in De Baca and Chaves counties.

Fish fossils have been found in Jurassic-age rocks in the Todilto Formation in Guadalupe County. In general, Jurassic-age rocks are missing over much of the resource area. However, small, isolated exposures of the Morrison Formation are in Quay County near Tucumcari.

Cretaceous-age marine fossils are found in exposures of the Lytle Sandstone, Glencairn Formation, Mesa Rica Sandstone, Pajarito Formation, Romeroville Sandstone, Graneros Shale, and Greenhorn Formation. Most of these occur in Lincoln County, and the northernmost counties of the resource area, near and north of Tucumcari.

Petrified wood and the fossilized remains of vertebrate and invertebrate fresh and salt-water animals have been found in the Pliocene-age Ogalala Formation. The Ogalala Formation is located in the eastern portion of the resource area.

Lastly, fossils representing the Late Pleistocene to Early Holocene are found in great abundance in the Quaternary sediments throughout the resource area. Fossils of such animals as the extinct mammoth, giant bison, horse, camel, saber-toothed cat, and giant short-faced bear are present in these sediments. These fossils have particular significance due to their potential to provide data and material that can be helpful in learning about environments and associated fauna of the more recent past (within the last 30,000 years). This information is relevant to any interpretations of the effect of natural processes on the development and alteration of ecosystems, and how those processes have influenced the interactions and adaptations among humans and animals and their environments through time.

WILDERNESS RESOURCES

Two wilderness study areas (WSAs) comprising 25,312 acres are located in the Roswell Resource Area. The BLM completed the New Mexico Statewide Wilderness Study Environmental Impact Statement and Wilderness Analysis Reports in 1991. The Little Black Peak (NM-060-109) and Carrizozo Lava Flow (NM-060-110A-1) WSAs were both recommended as suitable for wilderness designation by the New Mexico State Director. See Map 28 for approximate locations of the WSAs.

RECREATION

Recreational pursuits are considered to be either facility-based or dispersed. The Roswell Resource Area offers opportunities in both categories. Table 97 shows visitor use at some of the facility-based sites and some of the resource area's Special Recreation Management Areas (SRMA). Map 23 (in Chapter 2) shows the approximate location of the SRMAs.

THE VALLEY OF FIRES RECREATION AREA

This popular campground and unique lava flow is located four miles west of the town of Carrizozo on U.S. Highway 380, and 86 miles west of Roswell, near the BLM boundary between the Socorro and Roswell resource areas. The acreage within the recreation area is 462.5 acres. Three-quarters of the recreation area is composed of lava. The remaining area is a "kipuka," an island of Dakota Sandstone within the lava, but not covered by lava.

TABLE 97
1993 RECREATION USE FOR SELECTED AREAS
ROSWELL RESOURCE AREA

	Area					
	Valley of Fires		Fort Stanton		RRA Extensive	
Activity	Visits	Hours	Visits	Hours	Visits	Hours
OHV Travel	0	0	0	0	2,800	16,800
Other Motorized Use	11,417	68,502	47,580	285,480	0	0
Nonmotorized Travel	468	1,872	250	2,700	0	0
Camping	5,766	138,384	5,847	140,328	2,051	49,224
Land-Based	89,343	357,372	1,730	6,920	22,610	90,440
Hunting	0	0	3,120	18,720	140,500[1/]	843,000
Fishing	0	0	200	1,200	600	3,600
Boating	0	0	0	0	0	0
Caves (Permitted)	0	0	1116	16,294	120	1,752
Caves (Non-Permitted)	0	0	200	2,920	1,500	21,900
Total Visitor Hours		566,130		474,562		1,026,716

	Area					
	Mescalero Sands OHV		Haystack Mtn.		Total RA Use	
Activity	Visits	Hours	Visits	Hours	Visits	Hours
OHV TRAVEL	9,860	59,160	1,596	9,576	14,256	85,536
Other Motorized Use	10,379	62,272	595	3,570	69,971	419,824
Nonmotorized Use	234	1,404	59	354	1,011	6,330
Camping	100	2,400	50	1,200	13,813	331,536
Land Based	1,153	4,612	100	400	114,936	459,644
Hunting	100	600	100	600	143,820	862,920
Fishing	0	0	0	0	800	4,800
Boating	0	0	0	0	0	0
Caves (Permitted)	0	0	0	0	1,236	18,046
Caves (Non-Permitted)	0	0	0	0	1,700	24,820
Total Visitor Hours		130,448		15,700		2,213,456

Note: Visitation Statistics Multipliers: Camping - 24 hours; Other motorized use, nonmotorized use, hunting, fishing and OHV Travel - 6 hours; Land Based - 4 hours; Cave Use - 1.22 visitor days (14.6 hours).

[1/] Extrapolated from the New Mexico Game and Fish hunting statistics.

Source: Visitation use statistic were derived from traffic counters readings, Cave Permits, Recreation Information Management System annual use records and on-site inventories.

Facilities at the recreation area include 20 campsites, a full facility restroom, and a self-guided nature trail that provides a close-up look at the lava surface. A new visitor contact station and maintenance building was added to the recreation area in 1991. Visitation at Valley of Fires in FY 1991 was approximately 52,000 and fee collections totalled $17,500. During FY 1992, visitation increased to 69,065 (32.8 percent over 1991), and fees collected increased to $20,347, a 16 percent increase.

MESCALERO SANDS NORTH DUNE OFF-HIGHWAY VEHICLE (OHV) RECREATION AREA

The Mescalero Sands North Dune OHV area is located approximately 40 miles east of Roswell on State Highway 380. Approximately 640 acres of the larger Mescalero Sands Recreation Complex have been designated as an OHV area. Sand dunes comprising the Mescalero Sands Recreation Area are part of a north-south stretch of both drifting and stabilized Pleistocene dunes, some up to 60 feet high. A caliche-base road was constructed in 1988, which provides excellent access for passenger vehicles to the dunes. The site has six picnic tables, picnic shelter and a chemical toilet at one of three parking and dune access sites.

HAYSTACK MOUNTAIN OFF-HIGHWAY VEHICLE RECREATION AREA

Another popular OHV area, this site is located approximately 22 miles northeast of Roswell, just off U.S. Highway 70 at a location known as High Lonesome. The OHV area covers approximately 3,533 acres of public lands oriented north-south along a prominent sandstone escarpment area. There is legal access to only 1,280 acres, at this time. The terrain is extremely rugged, including such varied features as deep gullies with difficult hill climbs. Haystack Mountain is currently being used by motorcyclists from Roswell and surrounding areas.

THE GARNSEY BISON KILL SITE

This important archaeological site consists of a deposit of bison bones *in situ*. An arroyo has cut down through the deposition of bones exposing them to the elements. Bison skulls and bones protruding from the steep sides of the arroyo make this site very attractive for the development of interpretive facilities. The age of the bison kill is approximately 400 to 500 years. Excavations of portions of the site were conducted by the University of Michigan in 1977 and 1978.

UFO CRASH SITE

In 1947, the alleged crash of an unidentified flying object occurred on BLM lands northwest of Roswell. This world famous incident has led to the publication of numerous books. An interpretive opportunity unique to the BLM exists here, because there is considerable public interest in viewing this site.

BORDER HILLS STRUCTURAL ZONE NATIONAL NATURAL LANDMARK (NNL)

The Border Hills Structural Zone NNL is a geologic feature about 24 miles west of Roswell. It is a linear ridge that exhibits unusual geologic complexity. The NNL is about 160 acres in size.

MESCALERO SANDS OUTSTANDING NATURAL AREA (ONA)

The Mescalero Sands area is being managed as an ONA and NNL, with partially overlapping boundaries. A goal of this RMP is to simplify and improve management of the area by replacing the ONA designation with the Area of Critical Environmental Concern (ACEC) designation. The ACEC will contain the entire NNL and a more diverse landscape than that contained in either the NNL or the ONA.

RIO BONITO ACQUIRED LAND ("TRACT 5")

About 9 miles southeast of Fort Stanton, the BLM has proposed to acquire a tract of about 175 acres in size along the Rio Bonito for the development of a recreational facility.

DISPERSED RECREATION

Dispersed recreation occurs throughout the approximately 1.5 million surface acres of public land in the resource area. Table 97 displays visitor use figures for dispersed recreation. Dispersed recreation opportunities are concentrated primarily in Lincoln and Chaves counties. Most of the visitation in the resource area comes from dispersed recreational activities such as hunting, caving, fishing, sightseeing, primitive camping, biking, and hiking. Hunting is the most popular outdoor sport on public lands. Hunting for big game, waterfowl and upland game is estimated to provide in excess of 267,122 visitor hours each year.

CAVES

The resource area contains numerous caves, sinkholes, disappearing streams, and underground drainage systems. The term for this type of terrain is "karst." In karst areas, erosional processes which would normally act on the surface are concentrated below ground. File records list as many as 195 caves, and it is estimated that at least 400 caves actually exist in the Roswell Resource Area.

For purposes of classifying cave and karst occurrence, the Roswell Resource Area is divided into three geographical zones identified as having high, medium or low potential. Geologic sediments and structure are the primary factors on which these potentials are based. High potential areas contain known caves or have a high probability for caves. Medium potential areas are those that may contain caves based on geologic patterns similar or identical to high potential areas. Areas with low potential have geologic structures that do not normally support cave or karst development. Nevertheless, a low potential designation does not preclude a discovery of caves. Map 38 identifies the cave or karst areas in the Roswell Resource Area, and Table 98 provides information that further describes these areas.

Caves in the Roswell Resource Area provide a wide range of values, such as recreation, bat hibernacula and groundwater recharge features.

TABLE 98
CAVE OR KARST OCCURRENCE AREAS
ROSWELL RESOURCE AREA

Area[1]	Area Name	Depth[2]	Potential[3]
1	Malpais	500	High
2	Fort Stanton	400	Medium
3	Carrizozo	None	Low
4	Corona	400	Medium
5	Cibola	None	Low
6	Cibola 2	None	Low
7	Border Hill	500	Medium
8	Salt Creek	400	High
9	Artesia	None	Low
10	Buffalo Hills	350	High
11	Chaves-DeBaca	400	Medium
12	East RRA	None	Low

[1] Refers to areas on the "Cave or Karst Occurrence Areas" map for the Roswell Resource Area.

[2] Lowest likely depth, in feet, at which caves might be expected, measured from the surface. No cave depth for low potential areas.

[3] Potential for cave or karst occurrence.

Source: BLM files, 1994.

Cave or Karst Occurrence Areas

▨ High Potential

▤ Medium Potential

☐ Low Potential

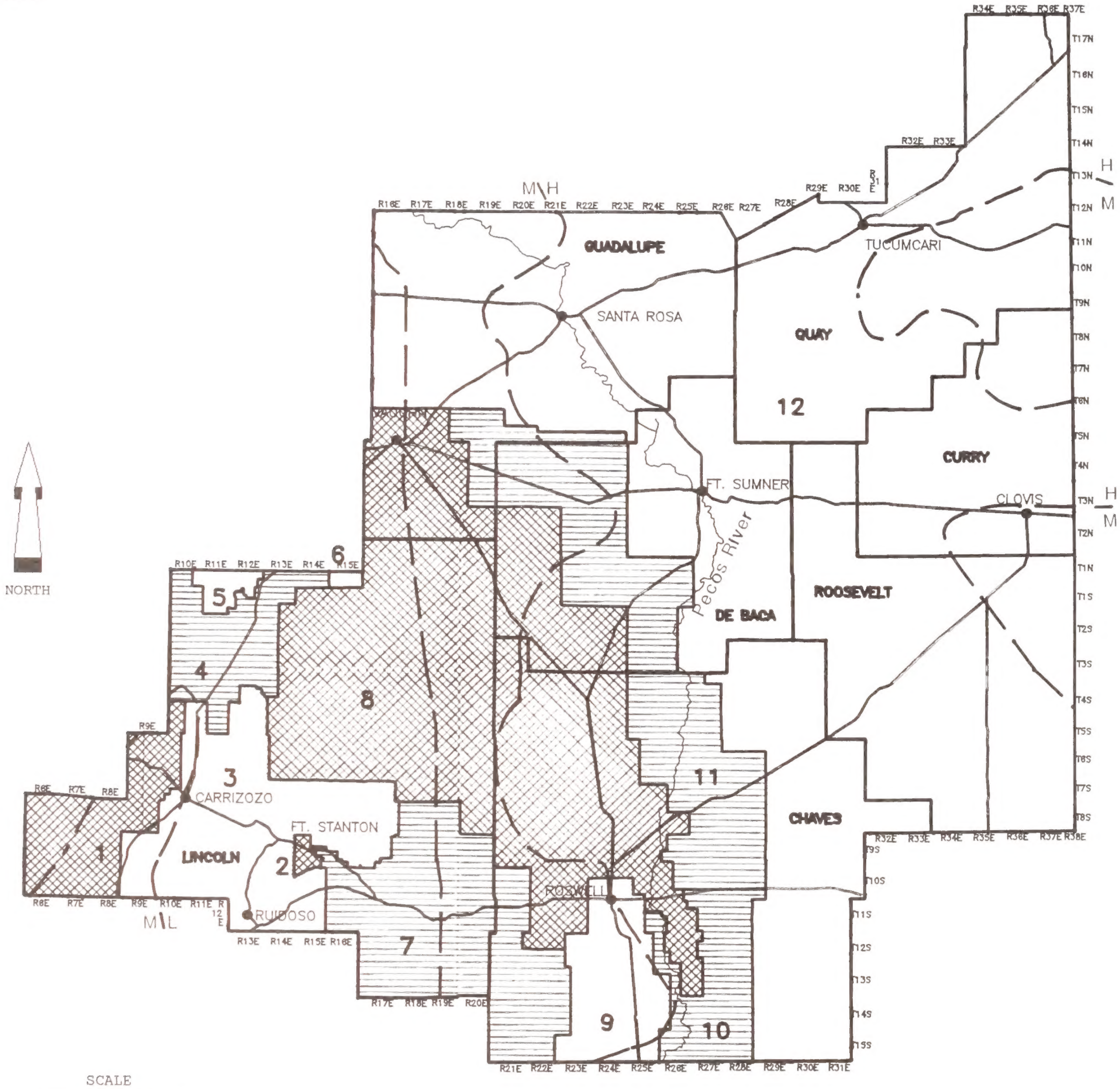
Oil & Gas Potential
Occurrence Boundaries

H = High Potential

M = Moderate Potential

L = Low Potential

NOTE - The table associated with this map shows the relative depth of each area shown on this map. For example, area number 1 is the Malpais Area which has a high potential for the occurrence of caves/karst features to a depth of 500 feet.



NORTH
QUADALUPE
SANTA ROSA
TUCUMCARI
QUAY
CURRY
CLOVIS
FT. SUMNER
Pecos River
DE BACA
ROOSEVELT
CHAVES
ROSWELL
LINCOLN
CARRIZOZO
FT. STANTON
RUIDOSO
VAUGHN
1
2
3
4
5
6
7
8
9
10
11
12
M\H
H
M
M\L
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R29E R30E R31E R32E R33E R34E R35E R36E R37E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
R10E R11E R12E R13E R14E R15E
R9E R6E R7E R8E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 38

CAVE or KARST OCCURRENCE AREAS

Roswell Resource Area

RECREATION OPPORTUNITY SPECTRUM

The BLM uses the Recreation Opportunity Spectrum (ROS) as one tool to identify recreational settings and opportunities. The Glossary contains a description of the characteristics that are used to define each class. The ROS is divided into six classes. The classes are: primitive; semi-primitive nonmotorized; semi-primitive motorized; roaded natural; rural; and modern urban. Table 99 shows the acreage of each class. Map 39 shows the approximate locations of the classes.

WILD AND SCENIC RIVERS

A survey and eligibility assessment was completed in the resource area in 1993, of rivers and streams for possible inclusion as components of the National Wild and Scenic River System. After evaluation of the streams and rivers in the resource area was completed, it was determined that no rivers or streams had truly outstanding remarkable values. Refer to Appendix 2.

VISUAL RESOURCES

The visual resources of the resource area were inventoried during the RMP development process. The visual resource management zones are described in the Glossary. Table 100 gives the approximate acreages of the zones. Map 40 delineates the management zones in the resource area.

SOIL RESOURCES

Soils in the resource area were surveyed as a cooperative effort between the USDA Soil Conservation Service (SCS), the Bureau of Land Management, and the New Mexico Agricultural Experimental Station between 1958 and 1987. Detailed soils information is in the Soil Survey of Chaves County, N.M., Northern Part (SCS 1980), Soil Survey of Chaves County, N.M., Southern Part (SCS 1980), Soil Survey of Lincoln County Area, N.M. (SCS 1983), Soil Survey of De Baca County, N.M. (SCS 1986), Soil Survey of Roosevelt County (SCS 1967), and Soil Survey of Southwest Quay County Area, N.M. (SCS 1956). Table 90 and Map 30 contain a general overview of slope in the Roswell Resource Area.

Alluvial soils vary in depth from shallow in the western portion of the resource area to deep along the Pecos River. Shallow alluvial soils are found on rolling hills, and are susceptible to water erosion, particularly in draws and drainages.

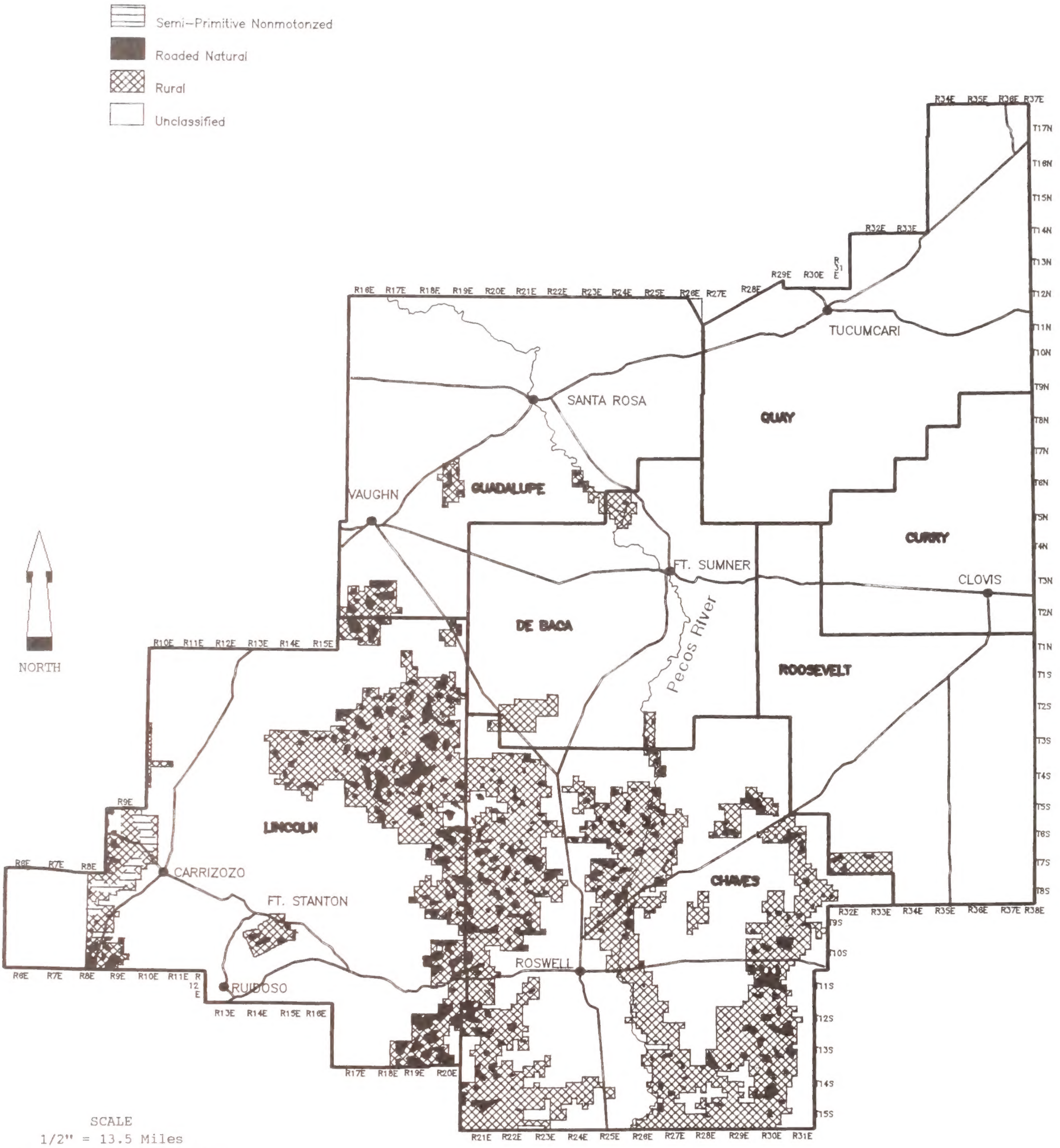
Soils in the eastern portion of the resource area are primarily derived from limestone, gypsum, and windblown sediments. These soils range from being nearly level to gently sloping, and range in depth from shallow to deep. Areas of steep, rocky soils occur along the breaks and ridges of the Pecos River and Mescalero Ridge.

Soils beyond the floodplain of the Pecos River, but still within the river's influence, are on level to moderately sloping topography and have varied textures. High concentrations of calcium and gypsum carbonates (caliche) occur in the substratum. These soils are moderately susceptible to water erosion and highly susceptible to wind erosion. Soils within the Pecos River floodplain consist of alluvial deposits with textures varying from clay to sand, and slopes that are nearly level. Susceptibility to water erosion is moderate, whereas susceptibility to wind erosion is high.

SOIL EROSION

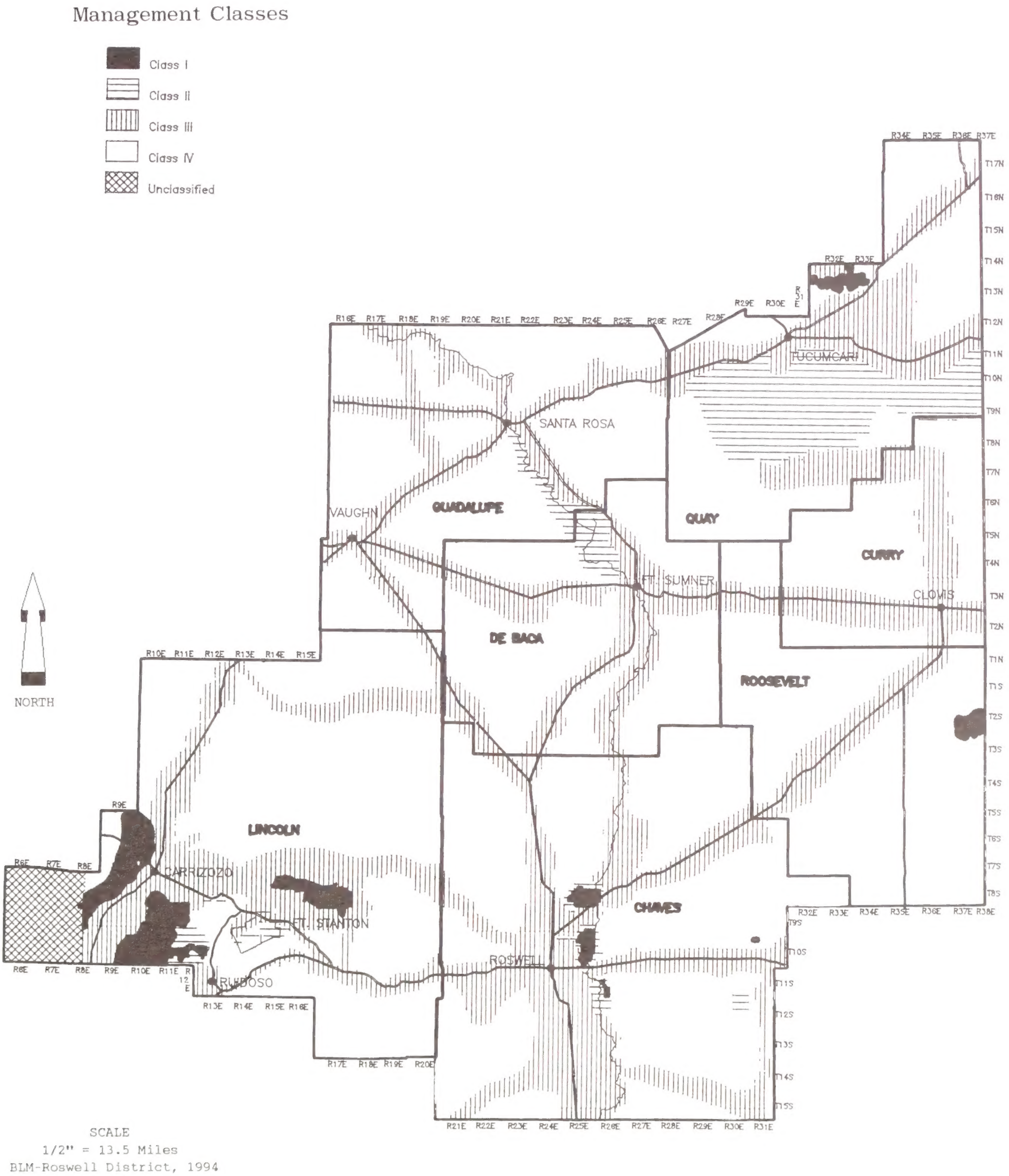
Soil erosion results from the detachment and transport of soil particles by the energy of wind, water, ice, and gravity. Susceptibility of soils to wind erosion is high in parts of the resource area due to strong winds, low precipitation, sparse vegetation, and large expanses of unobstructed terrain. Winds can pick up and carry very fine clay to silt size particles (up to approximately 0.02 mm), but move larger sand size particles (about 1 mm) along the ground surface. This results in well-sorted soils as seen in the shinnery oak-dune community.

Soils having high water erosion hazard potential are usually associated with one or more of the following factors: long, steep slopes; sparse ground cover; low infiltration rates; and rapid runoff. Soil erosion by water is generally categorized as raindrop impact erosion, rill erosion, or inter-rill (i.e. sheet) erosion. When vehicle tracks, livestock and wildlife trails, hiking trails, and roads are not properly constructed or maintained, channels form. Once uncontrolled surface runoff becomes channelized, severe gullying



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 39
RECREATION OPPORTUNITY SPECTRUM
Roswell Resource Area


Management Classes
▇ Class I
☰ Class II
▥ Class III
☐ Class IV
▩ Unclassified
NORTH
SANTA ROSA
TUCUMCARI
VAUGHN
GUADALUPE
QUAY
CURRY
FT. SUMNER
CLOVIS
DE BACA
ROOSEVELT
LINCOLN
CARRIZOZO
FT. STANTON
CHAVES
ROSWELL
RUIDOSO
R34E R35E R36E R37E
R32E R33E
R29E R30E R31E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R10E R11E R12E R13E R14E R15E
R9E
R6E R7E R8E
R6E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 40
VISUAL RESOURCE MANAGEMENT
Roswell Resource Area

TABLE 99
RECREATION OPPORTUNITY SPECTRUM ROSWELL RESOURCE AREA

Opportunity Classes	Acres
Primitive	0
Semi-Primitive Nonmotorized	32,850
Semi-Primitive Motorized	0
Roaded Natural	387,441
Rural	1,069,398
Unclassified	12,475,311
Total	13,965,000

Note: The Recreation Opportunity Spectrum (ROS) inventory/survey was limited to zone 1. All lands (public, state and private) in zone 1, except those considered urban, were inventoried during the survey process. The ROS provides a framework for defining the types of outdoor recreation opportunities the public might desire, and identifies opportunities that might be available.

Source: BLM files, 1994.

TABLE 100
VISUAL RESOURCE MANAGEMENT CLASSIFICATION ROSWELL RESOURCE AREA

Classification	Acres
Class I	258,330
Class II	699,160
Class III	3,802,400
Class IV	9,015,680
Class V	None
Unclassified	189,430
Total	13,965,000

Note: No distinction was made between private, state, and federal lands surveyed for this inventory.

Source: BLM files, 1994.

can occur. Water erosion has its greatest impact in late summer during the thunderstorm season, when high-intensity, short-duration events are common.

Sediment control plans have been prepared for New Mexico counties (New Mexico Soil and Water Conservation Division 1976). Included in each sediment control plan is a map of estimated long-term average soil loss, expressed in acre-feet per square mile per year. Note that the soil loss figures represent gross erosion (i.e. the sum of sheet, rill, gully, and stream erosion), rather than sediment yield (see Glossary).

Map 41 shows that portions of three watersheds in the Roswell Resource Area are susceptible to severe long-term soil loss (i.e. mean annual soil loss estimated to be equal to or greater than 1.0 ac-ft/mi^2/yr). These areas are: the Rio Bonito including Salado Creek; the Pecos River from confluence of Yeso Creek to Bitter Lake National Wildlife Refuge; and, the closed drainage area to Nakee Ishee Lakes.

Four watersheds have also been identified in the resource area as being susceptible to severe gully erosion. These watersheds are: the Rio Bonito including Salado Creek; Arroyo del Macho; Gallo Arroyo; and the Feliz River.

WATER RESOURCES

SURFACE WATER

The majority of BLM surface ownership lies within the Pecos River Basin. A portion in western Lincoln County drains to the Tularosa Basin, and the remaining acreage exists as scattered parcels in the Canadian River and Texas Gulf Basins. Major tributaries of the Pecos River with a high percentage of BLM surface ownership include: the Rio Hondo (including the Rio Bonito and Salado Creek watersheds); the Rio Felix; Salt Creek; Arroyo del Macho (including Cowboy Draw); and Long Arroyo.

The Federal Emergency Management Agency has published maps of the one-hundred-year floodplain of some major drainages in the resource area. Chaves and Lincoln counties have been most extensively mapped.

Surface water quality standards have been established by the New Mexico Water Quality Control Commission (WQCC) (1991). Surface waters in the Roswell Resource Area which the WQCC has identified as not fully supporting designated or attainable uses have also been published by the WQCC (1992). Stream reaches with significant BLM acreage in their watershed include the following:

Pecos River from Salt Creek to Sumner Dam:

- Use not fully supported: Limited warm water fishery.
- Probable Causes of Nonsupport: Metals, siltation, reduction of riparian vegetation, and streambank destabilization.

Pecos River from Rio Penasco to Salt Creek:

- Use not fully supported: Warm water fishery.
- Probable Causes of Nonsupport: Metals, dissolved oxygen, unionized ammonia, total dissolved solids, siltation, reduction of riparian vegetation, and streambank destabilization.

Rio Bonito from confluence with Rio Ruidoso to Angus Canyon:

- Uses not fully supported: Marginal cold water fishery and irrigation.
- Probable Causes of Nonsupport: Siltation, pathogens, and habitat alteration.

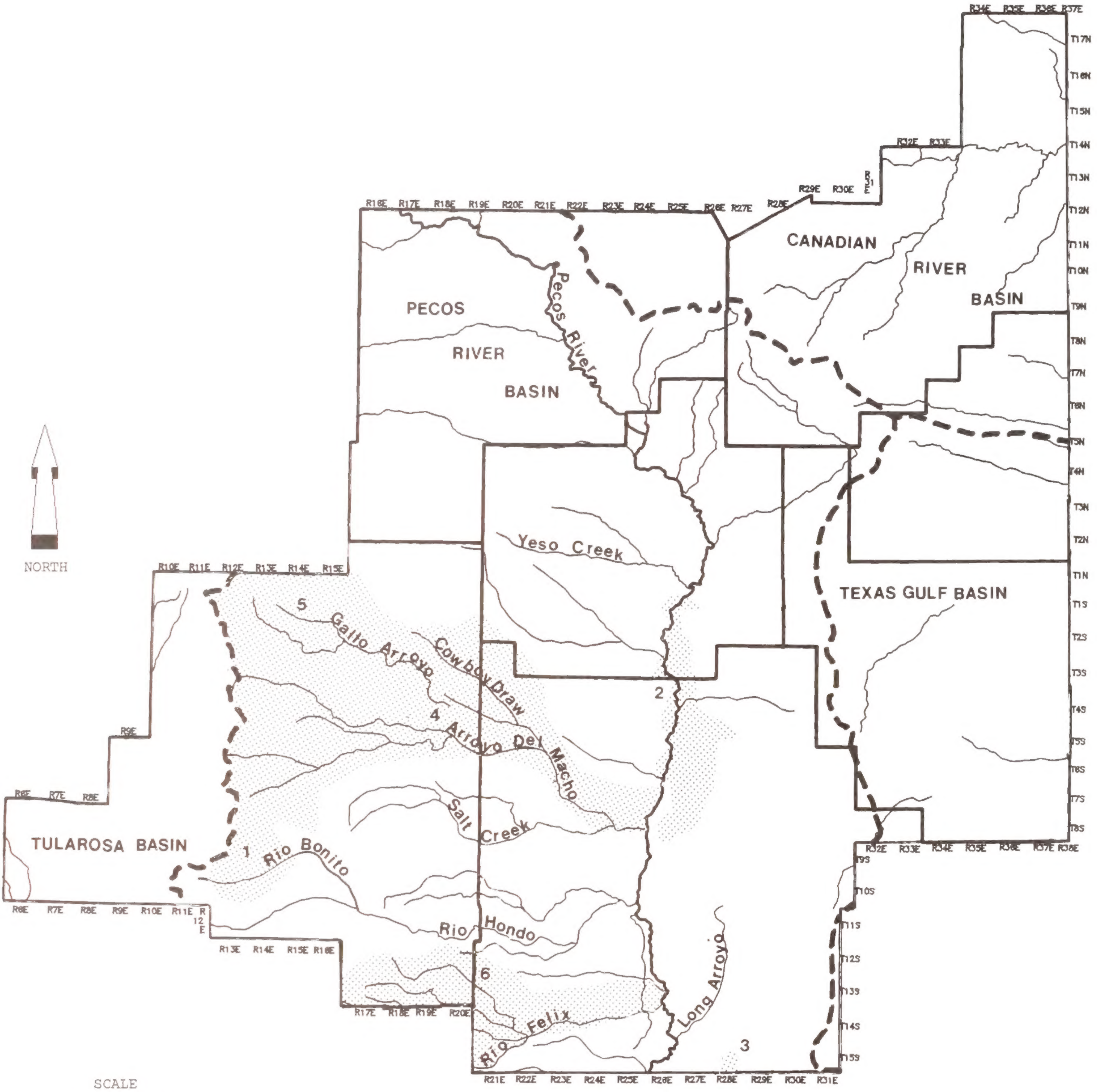
GROUND WATER

The New Mexico State Engineer (1991) has declared nine "underground water basins" in the resource area: Upper Pecos; Fort Sumner; Tucumcari; Curry County; Portales; Lea County; Roswell; Hondo; and Tularosa. The State Engineer administers water rights in declared basins, whereas water rights outside the declared basins are protected by the Appropriation Doctrine. The State Engineer is currently extending the boundaries of the underground basins and should have updated legal descriptions published in 1994. Agriculture is the primary use of groundwater in the resource area, with additional demands by a municipality, industry, livestock, and wildlife. Ground water is located in

▨ Watersheds

1 - Rio Bonito including Salado Creek
2 - Pecos River from confluence at Yeso Creek to Bitter Lake National Wildlife Refuge
3 - Drainage area to Nakee Ishee Lakes
4 - Arroyo Del Macho
5 - Gallo Arroyo
6 - Rio Felix

Surface Drainage Basin Divide



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 41
CRITICAL WATERSHEDS
Roswell Resource Area

Small ponds and playas are important sources of water for wildlife.

two primary aquifers separated by a confining layer. The shallow aquifer is made up of unconsolidated alluvium (Quaternary and Tertiary Age), and the lower aquifer consists of consolidated limestones and sandstones (Permian Age). Depth to ground water typically ranges from less than 10 to 100 feet in the unconsolidated alluvium, and from 300 to 1,000 feet or more in the consolidated limestones and sandstones.

Standards and regulations applying to ground-water quality and supplies have been established by the WQCC (1991) and the New Mexico Environment Department (1991). Rules and regulations governing the drilling of wells and the appropriation and use of ground water in New Mexico are published by the New Mexico State Engineer (1991).

AVAILABLE WATER RESOURCES

Many BLM activities require the use of water, or can affect the quality and quantity of available water in the resource area. Therefore, a comprehensive inventory of water resources, including their water rights status is essential for effective management. Incomplete and out-of-date water availability information has been identified as a data gap.

Water availability depends on the physical presence and the legal availability of water resources. The adjudication of the Pecos River Basin began in 1956, and is likely to continue beyond the life of this plan. Water needs and availability for management of BLM resources will have to be addressed in the adjudication. Presently, there are 358 water sources identified in the Roswell Resource Area (see Table 101).

AIR RESOURCES

The air quality in the Roswell Resource Area is generally very good. Summer winds flow from the southeast, becoming southwesterly in the winter and early spring. Winds average 10 miles per hour (mph) in the fall and 16 mph in the spring. Peak velocities can exceed 50 mph. This combination gives southeastern New Mexico some of the best conditions in the nation for rapid dispersal of pollutants.

The Roswell Resource Area is classified as a Class II air quality area. A Class II area allows a moderate amount of degradation of air quality. Within the boundary of the Roswell Resource Area, the Salt Creek Wilderness and the White Mountain Wilderness, which together contain 58,494 acres of land, are classified as Class I air quality areas. Class I areas have air quality that is pristine.

Degradation of air quality in portions of the resource area is the result of pollutants such as nitrogen dioxide, hydrocarbons, carbon monoxide, and particulate matter from motor vehicles, blowing dust, dirt roads and combustion at major industrial sites. Automobile exhaust from the more densely populated area of Roswell contributes to air pollution. This is especially evident during the winter when temperature inversions prevent the escape and dispersion of polluted air to higher altitudes. These inversions are usually of short duration because of storm fronts and unstable cold air masses moving through the area.

TABLE 101
WATER SOURCES
ROSWELL RESOURCE AREA

Use	Number of Sources
Municipal Supply	1
Flood Control	1
Livestock/Wildlife	346
Sediment Control	1
Irrigation	1
Use Not Specified	8
Total	358

Source: BLM files, 1994.

Summer inversions last longer. Convection columns can occur at any time of the year or at any place, particularly in the summer when solar radiation destabilizes the air close to the ground and produces air turbulence that can disperse trapped auto emissions.

Wind action on exposed or disturbed soils is a primary source of air pollution in this area. The soil particles create dust storms of various magnitudes, depending on wind velocity. Early spring winds cause blowing dust, which contributes to air pollution. Extensive preparation for spring planting is the source of much of the blowing dust.

The Roswell Resource Area contains most of the Pecos-Permian Basin Intrastate Air Quality Control Region (State Region 5). Guadalupe County is in State Region 4 and Lincoln County is in Region 6.

Oil and gas extraction and storage activities also influence air quality in the resource area. Underground formations in southeastern New Mexico contain naturally occurring hydrogen sulfide (H_2S) gas. Each oil or gas well varies in the amount of gases produced, but some concentrations of up to 100,000 parts per million can occur. Those wells or sites producing H_2S are marked with signs and wind socks to warn of high levels of gases. High levels sometimes occur when weather inversions occur over the resource area.

WILDLIFE

The resource area is comprised of several distinct community types based primarily on vegetation, soils and landform. The Sacramento and Capitan Mountains to the west, the Chihuahuan Desert to the south, and the High Plains to the north and east greatly influence floral and faunal diversity.

Federal, state and private lands in the resource area provide habitat for approximately 500 species of wildlife. Public lands provide important habitat for big game mammals and upland game birds, furbearers and non-game mammals, game and non-game fish, raptors or birds of prey, various songbirds, reptiles and amphibians, and a variety of flora.

A variety of big game mammals are found throughout the resource area. Big game mammals for which the BLM manages habitat are mule deer and pronghorn antelope.

BIG GAME

Mule Deer

Mule deer are widespread throughout the resource area and are most abundant in drainages/draws/canyons, pinon/juniper, mixed shrub malpais, shinnery oak-dune, riparian/wetland community types and on escarpments. Key forage species include Apache plume, little leaf sumac, skunkbush, fourwing saltbush, Gambel's oak, mountain mahogany, shinnery oak, willows, and various forbs.

Data provided in the New Mexico Department of Game and Fish Operation Plan, Terrestrial Management of New Mexico Wildlife 1987-1995, indicate an estimated population of about 35,700 mule deer in the resource area, of which about 7,700 occur on public land. All or portions of thirteen NMDGF herd units fall within the resource area.

There are six major, occupied mule deer management areas delineated by the BLM in coordination with the NMDGF. These areas are in addition to the NMDGF Mule Deer Herd Units which are generally administrative boundaries. Occupied mule deer areas are those areas where mule deer have demonstrated a definite pattern of use each year or areas where mule deer tend to concentrate in significant numbers. These areas include the Carrizozo Malpais, Fort Stanton, Cedar Hills, the Southwest Roswell area, the Pecos River area, and the Mescalero Sands area. Map 42 displays the mule deer management areas in the Roswell Resource Area.

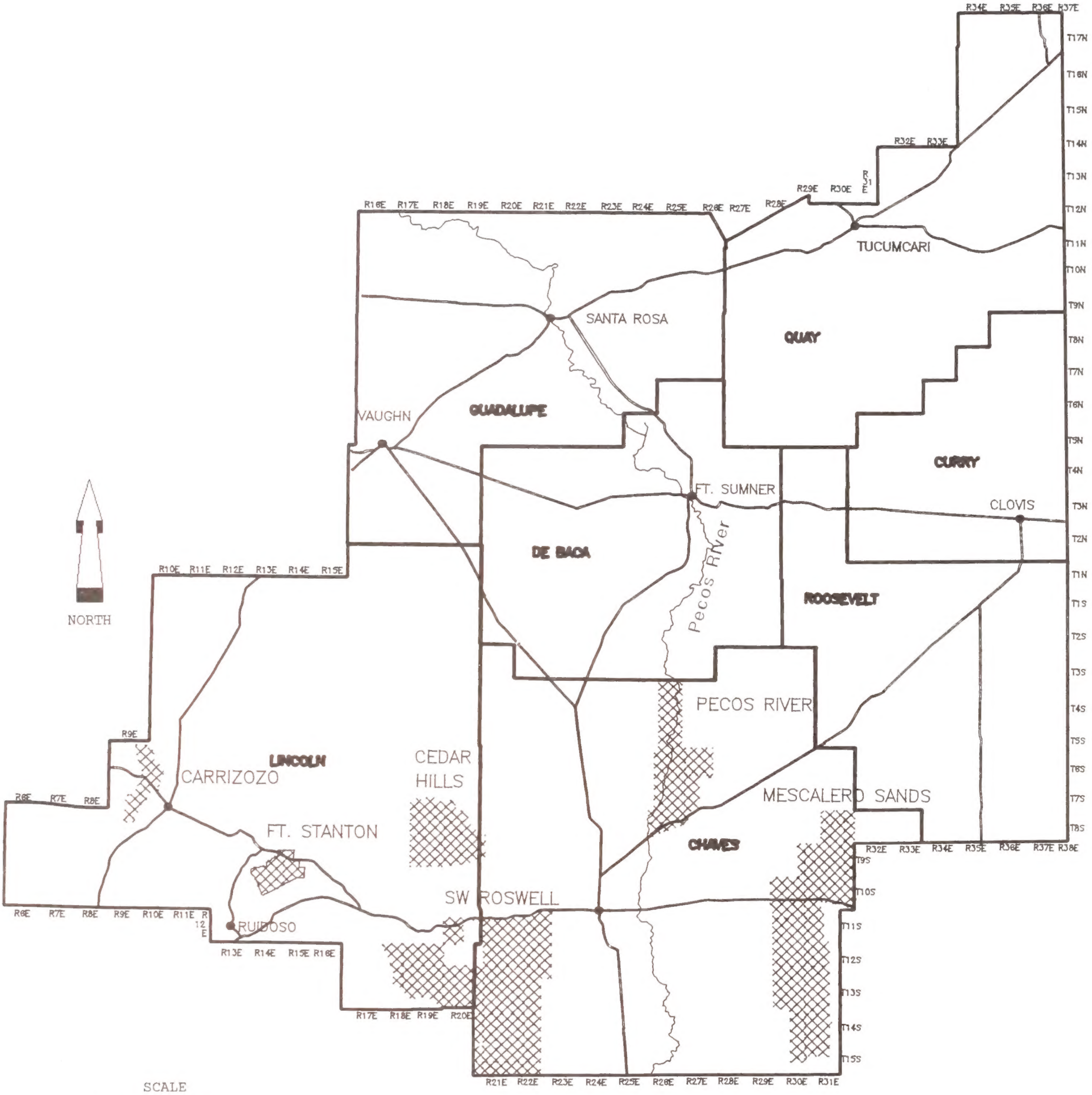
A very small population of white-tailed deer inhabit the riparian/wetland community type in certain areas of the Pecos River and the shinnery oak-dune community type at Mescalero Sands. There are no population estimates available for white-tailed deer.

Pronghorn Antelope

Pronghorn antelope herds are found throughout the resource area, but primarily in the grasslands and shinnery oak-dune community types. Pronghorn

The public lands provide valuable habitat for antelope and many other wildlife species.

▨ Mule Deer Management Areas


NORTH
TUCUMCARI
SANTA ROSA
QUAY
VAUGHN
GUADALUPE
CURRY
FT. SUMNER
CLOVIS
DE BACA
Pecos River
ROOSEVELT
PECOS RIVER
LINCOLN
CEDAR HILLS
CARRIZOZO
MESCALERO SANDS
FT. STANTON
CHAVES
SW ROSWELL
RUIDOSO
R34E R35E R36E R37E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S
R32E R33E
R29E R30E R31E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R10E R11E R12E R13E R14E R15E
R9E
R6E R7E R8E
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R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E

SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 42
MULE DEER MANAGEMENT AREAS
Roswell Resource Area

distribution is affected by net wire fencing in the west half of the resource area, which is predominately a sheep grazing area. Pronghorn habitat outside of sheep areas is grazed by cattle. Pronghorn distribution is relatively unaffected by barbed-wire fencing that allows pronghorn movement between cattle pastures and allotments. New Mexico Department of Game and Fish data indicate an estimated population of about 4,400 pronghorn antelope on public lands in the resource area.

All or portions of twelve NMDGF antelope herd units fall within the resource area boundary.

Other big game mammals found in the resource area are: mountain lions in the drainages/draws/canyons and pinon/juniper community types in the foothills of the Sierra Blanca and Capitan Mountains; black bear and elk in small numbers at Fort Stanton; and small herds of Barbary Sheep in the mixed shrub malpais and drainages/draws/canyons communities in the foothills of the Sierra Blanca Mountains.

UPLAND GAME BIRDS

The lesser prairie chicken is the primary upland game bird species for which the BLM manages habitat. Prairie chickens are found almost exclusively in the shinnery oak-dune community type. The birds are not migratory and use this area on a yearlong basis. The BLM's population trend data indicates a stable population numbering between 2,000 and 3,000 birds.

Other upland game bird species found in the resource area include scaled quail, bobwhite quail, Mearn's quail, wild turkey, mourning dove, white-winged dove, band-tailed pigeon, and ring-necked pheasant, whose populations are distributed within suitable habitat throughout the resource area.

FURBEARERS

Protected and unprotected furbearers include raccoon, badger, gray fox, kit fox, red fox, swift fox, ringtail cat, bobcat, beaver, nutria (introduced), muskrat, long-tailed weasel, coyote, and skunk. Raccoon, beaver, nutria, muskrat and long-tailed weasels prefer the riparian/wetland community. Coyotes occur throughout the resource area and provide significant hunting and trapping opportunity, plus income through the sale of furs. In certain areas, coyote populations have been limited by activities conducted by the USDA Animal Damage Control; otherwise, population densities are relatively high.

SPECIES HAVING SPECIAL HABITAT NEEDS

Raptors

The resource area provides habitat for 27 species of raptors. Raptor habitat typically includes nest sites, foraging areas, and roosting or resting sites. The most important raptor nesting habitats in the resource area are found along riparian areas, on cliffs, and in large mesquite trees in grasslands. No recent raptor surveys have been conducted to monitor population trends of raptor species in the resource area.

Shorebirds and Waterfowl

About 193 species of shorebirds are dependent on the riparian/wetland community type and special habitat features such as earthen tanks, playas and alkali lakes. Many of these species are also migratory.

Waterfowl distribution is closely associated with the Bitter Lake National Wildlife Refuge and the BLM Overflow Wetlands Wildlife Habitat Area. About 26 species of waterfowl can be found in the resource area. The majority of waterfowl species are migratory, although a few species are yearlong residents. High numbers of wintering snow and Ross' geese and sandhill cranes use the shallow ponds at the BLM Overflow Wetlands WHA. Winter counts of approximately 4,400 lesser sandhill cranes were made at the Overflow Wetlands in 1991. Earthen tanks and playa lakes provide small wetland habitat areas. Small numbers of waterfowl use the Riparian/Wetland type along the Rio Bonito and Salado Creek at Fort Stanton.

Lesser Prairie Chicken

Prairie chickens congregate on booming grounds for courtship displays in spring. The prairie chickens choose grounds that are relatively void of vegetation so that visibility is good and calls can be heard for greater distances. Booming grounds are located on sites in mesquite-shortgrass and shinnery oak-tall grass habitats, and on bare dunes, abandoned oil pads, pipeline rights-of-way, and roads. The grounds are relatively permanent; territorial males return to the same ground each year. Inventories have been conducted since 1971, with about 300 grounds identified on federal, state and private lands. About 78 percent of the grounds occur on BLM surface or mineral estate. There are an estimated 1.2 million acres of potential habitat in the resource area, primarily in the sand hills country east of the Pecos River to the Texas border. Nests are usually established in habitats with high canopy coverage of tall, perennial grasses, mainly sand bluestem (NMDGF 1994). Nest sites are typically located within two miles from booming grounds. Noise and disturbance during the critical mating and nesting period appear to be major limiting factors in the maintenance of prairie chicken populations. See Map 43 for approximate locations of prairie chicken leks.

Dunes Sagebrush Lizard

For habitat, the dunes sagebrush lizard (*Sceloporus arenicolous*) requires the nearly homogenous stands of shinnery oak that cover the partially stabilized dunes in the Mescalero Sands region of Chaves, Eddy, Lea, and possibly, Roosevelt counties. Potential habitat in the Roswell District is estimated to be 776,600 acres, based on SCS range site descriptions, which include sand hills and deep sand sites with shinnery oak. Active or semi-active sand dunes with "blowouts" must be present for the species to occur within an area. Disturbance of these dunes would present a significant deterrent to the continued existence of the lizard in those areas. These lizards exhibit strong site fidelity and are not thought to move between dunes complexes. Because of the unique and limited habitat of the lizard, actions that result in direct loss, modification, or fragmentation of its habitat will likely jeopardize the future of this species (NMDGF 1994).

FISH

About 44 species of fish occur in the resource area. Sport fish species include rainbow, brook and brown trout, bluegill, bullhead and catfish, longnose gar, black bass, spotted bass, and crappie. The only significant fishery habitats are the Rio Bonito at Fort Stanton and the Pecos River. Thirteen special status species occur or may occur within the resource area, twelve species are associated with the Pecos River drainage.

BATS

There is a wide variety of species of bats in the resource area. The numerous cave and karst features scattered throughout the resource area provide important habitat features. Proper management of this habitat appears crucial to the future of bat populations. Bats appear to be very sensitive to disturbance, particularly during periods of hibernation.

SPECIAL STATUS SPECIES

Threatened, endangered, and candidate animal species, both federal and state, and their current status, are listed in Appendix 17.

Plants

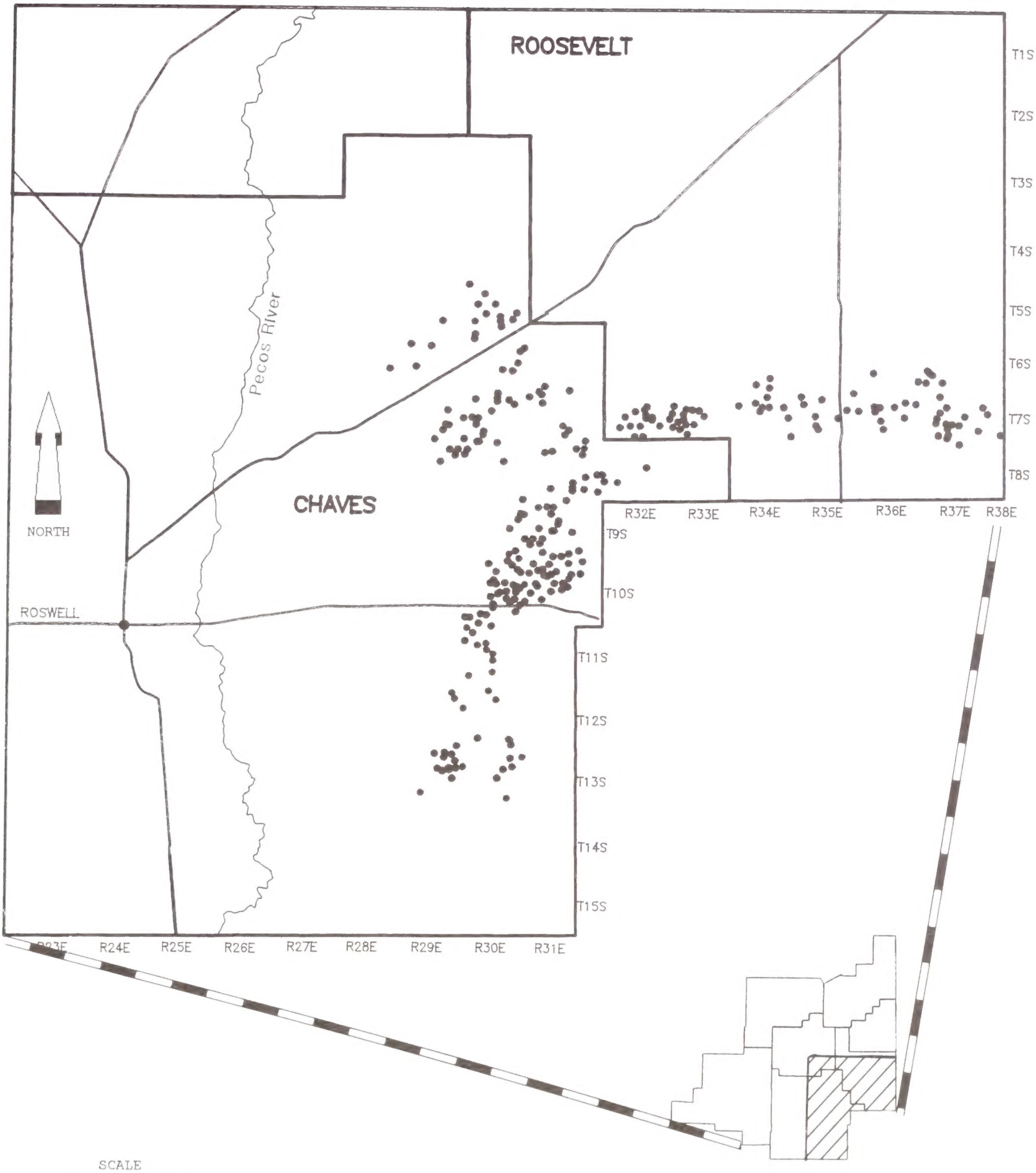
The resource area provides habitat for nine special status plant species. The following plants have the potential to occur in the resource area, but populations have not been identified on public lands: Pecos sunflower, Grama grass cactus, Guadalupe valeriana, Kerr's milk vetch; Button cactus, Wright's fish hook cactus, Catchfly gentian, and Prairie gentian.

The largest known population of the federally listed endangered Kuenzler hedgehog cactus occurs on 14,800 acres of public land at Fort Stanton. The size of the Fort Stanton population is estimated to be 1,000 individuals. Prime habitat is on open southeast-facing aspects on the upper third of 20 percent slopes in the pinon/juniper zone at 6,600 feet to 6,900 feet elevation. Preliminary data shows that the prime microhabitat around the cactus is approximately 60 percent ungrazed grass cover, 35 percent rock and gravel, and five percent bare soil.

Animals

The resource area provides habitat for 41 special status animal species.

● Prairie Chicken Leks



SCALE
1/2" = 7.1 Miles
BLM-Roswell District, 1994

MAP 43
PRAIRIE CHICKEN LEKS
Roswell Resource Area

Endangered Bird Species

The resource area provides habitat for four endangered bird species--the bald eagle, peregrine falcon, Aplomado falcon, and interior least tern.

Wintering bald eagle habitat varies from arid grassland and shrubland to aquatic sites at lower and middle elevations. Numbers build up gradually in November and December, peaking in January and February, followed by a decline and exodus in March. Major areas of occurrence within the resource area include the Fort Sumner-Santa Rosa, Capitan-Roswell, Sierra Blanca, and Capitan Mountain areas (Hubbard 1979). Use areas include streamside habitat along the Pecos River, Fort Sumner Lake, Bitter Lake National Wildlife Refuge, Rio Bonito, and Bonito Lake. Use areas also include non-aquatic habitat areas such as the grasslands community type in the Capitan-Roswell area, where eagles may seek carrion.

No confirmed peregrine aeries have been located on public lands in the resource area (Hubbard & Bednarz 1980). The Aplomado falcon, once fairly common, is now probably extirpated.

The interior least tern has nested on Bitter Lake in the Bitter Lake National Wildlife Refuge. Nesting sites on public lands have not been detected or recorded.

Other special status bird species that may inhabit the resource are the western snowy plover, mountain plover, western yellow-billed cuckoo, white-faced ibis, Mexican spotted owl, Bell's vireo, gray vireo, and southwestern willow flycatcher.

Endangered Mammal Species

There are no known threatened or endangered mammal species in the resource area. Other special status mammal species that may inhabit the resource are the swift fox, Arizona black-tailed prairie dog, occult little brown bat, all of which are federal candidate species, and the least shrew, which is a state-listed endangered species.

Endangered Fish Species

The Pecos River from Fort Sumner Lake to the Chaves-Eddy County line provides habitat for two threatened or endangered fish. The endangered Pecos gambusia formerly occurred throughout the lower Pecos River drainage and as far north as Fort Sumner. It is now limited to the Bitter Lake National Wildlife Refuge and some springs in the Carlsbad Resource Area. No known populations occur on public lands in the Roswell Resource Area. The threatened Pecos bluntnose shiner inhabits the Pecos River from below Lake Sumner downstream to Brantley Reservoir. The abundance of the species is unknown.

Other Special Status Fish Species

The Pecos pupfish is found in the Pecos River drainage south from Bitter Lake National Wildlife Refuge and Bottomless Lakes State Park to the Texas border. The pupfish is found on BLM lands at the Overflow Wetlands Wildlife Habitat Area.

The Rio Grande shiner is native to the Rio Grande and Pecos River drainages. It is now confined to the Pecos River south of Sumner Lake along with the terminus of major tributaries. The population is stable in the Pecos River drainage.

RIPARIAN AND WETLAND AREAS

The resource area contains approximately 32 miles and 2,250 acres of riparian/wetland habitat on public lands (see Table 102).

Pecos River

Existing or potential fish habitat along the middle Pecos River is made significant by the presence of several special status fish species. Numerous other wildlife species are dependent on the middle Pecos River for habitat and food sources. The Pecos River provides seasonal habitat for special status species, including the bald eagle, and the western yellow-bellied cuckoo.

Overflow Wetlands

The Overflow Wetlands is located about 16 miles southeast of Roswell. The naturally-occurring wetlands is one of the most important riparian areas in southeastern New Mexico and one of the best in the state. About 700 acres of wetland habitat and about six miles of the Pecos River are within the boundaries of the Overflow Wetlands.

Rio Bonito and Salado Creek

Within Fort Stanton, the Rio Bonito flows across five miles of public land and three miles of state land. Salado Creek is formed by the merging of Oso and Magado creeks about one-half mile east of Capitan. Within Fort Stanton, Salado Creek flows across three miles of public land to Salado Dam, and then for another mile before entering private land. Fort Stanton was dedicated on April 21, 1991, as the Bureau of Land Management's first riparian showcase area, to highlight riparian enhancement efforts on the Rio Bonito and Salado Creek.

Rio Bonito Acquired Land

Seven miles downstream from Fort Stanton, the BLM has acquired about 430 acres of land along the Rio Bonito (sometimes referred to as Tract 4), to manage for a variety of riparian values. Nearby, additional acreage in three parcels is proposed for acquisition for similar purposes.

SINKHOLES, PLAYAS, ALKALI LAKES

There are about 60 sinkholes, playas and alkali lakes in the resource area. These features provide important habitat values for waterfowl, shorebirds, perching birds, and numerous mammals. The size of these features range from a few acres to hundreds of acres.

SPRINGS AND SEEPS

There are about 20 springs or seeps in the resource area, each with an area of about one acre. These features provide important habitat for various wildlife species dependent on these water sources for either for all or part of their life cycle.

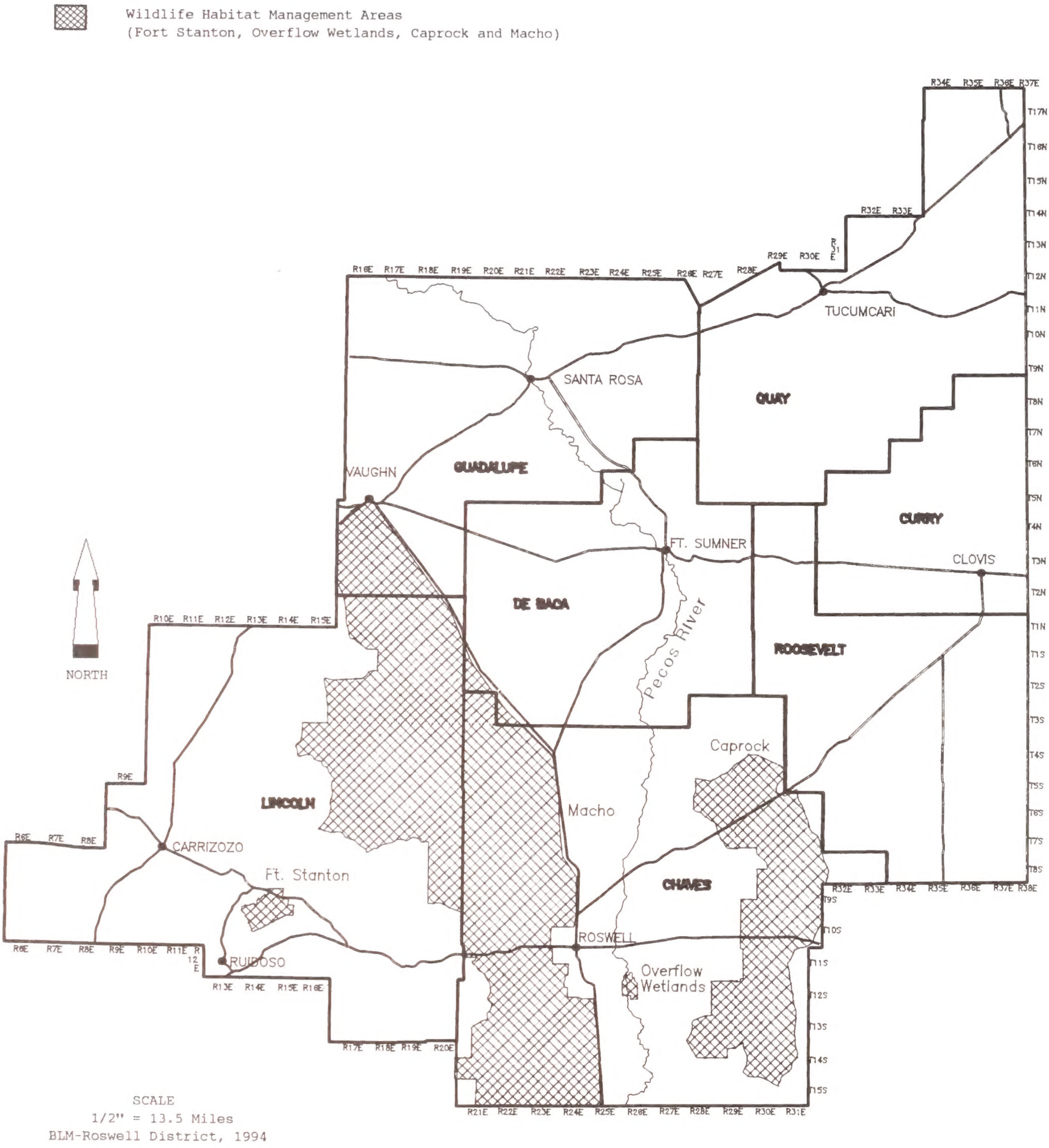
WILDLIFE HABITAT MANAGEMENT AREAS

There are four wildlife habitat management areas (WHAs) in the resource area: (Map 44 displays approximate locations.)

TABLE 102
AREAS OF RIPARIAN/WETLAND HABITAT
ROSWELL RESOURCE AREA

Name Size (Surface Acres)	Length (Miles) Habitat On Public Land	Condition
Pecos River	19.0 miles/1,377 acres	Fair
Rio Bonito	2.4 miles/104 acres	Poor/Fair
	1.3 miles/53 acres	Good
	1.3 miles/53 acres	Excellent
Salado Creek	2.7 miles/65 acres	Poor/Fair
	0.8 mile/25 acres	Excellent
Overflow Wetlands	4.0 mile/300 acres	Excellent
Salado Cr. Wetlands	0.3 mile/250 acres	Fair
West Spur Spring	2 acres	Excellent
Commanche Spring	2 acres	Excellent
Garnsey Spring	1 acres	Excellent
McCrea Spring	1 acres	Excellent
Goat Spring	1 acres	Fair
Black Rock Spring	1 acres	Fair
Bull Gap Spring	1 acres	Poor
Bosque Spring	1 acres	Poor

Source: BLM files, 1994.


▨ Wildlife Habitat Management Areas
(Fort Stanton, Overflow Wetlands, Caprock and Macho)
NORTH
SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994
QUAY
GUADALUPE
CURRY
DE BACA
ROOSEVELT
LINCOLN
CHAVES
TUCUMCARI
SANTA ROSA
VAUGHN
FT. SUMNER
CLOVIS
CARRIZOZO
RUIDOSO
ROSWELL
Pecos River
Caprock
Macho
Ft. Stanton
Overflow Wetlands
R34E R35E R36E R37E
R32E R33E
R29E R30E R31E
R16E R17E R18E R19E R20E R21E R22E R23E R24E R25E R26E R27E R28E
R10E R11E R12E R13E R14E R15E
R9E
R6E R7E R8E
R6E R7E R8E R9E R10E R11E R12E
R13E R14E R15E R16E
R17E R18E R19E R20E
R21E R22E R23E R24E R25E R26E R27E R28E R29E R30E R31E
R32E R33E R34E R35E R36E R37E R38E
T17N T16N T15N T14N T13N T12N T11N T10N T9N T8N T7N T6N T5N T4N T3N T2N T1N
T1S T2S T3S T4S T5S T6S T7S T8S T9S T10S T11S T12S T13S T14S T15S

MAP 44

WILDLIFE HABITAT MANAGEMENT AREAS

Roswell Resource Area

The Fort Stanton WHA, about 27,700 acres in size, is in the foothills of the Sierra Blanca and Capitan mountains. The principal management goal of the WHA is to restore the riparian and upland areas to aid a wide variety of wildlife species, including mule deer and elk.

The Overflow WHA, covering about 2,987 acres of public land, lies along the Pecos River about 16 miles southeast of Roswell. The management goal of the WHA is manage, protect, maintain and enhance the natural wetlands and aquatic habitat for a wide range of species, including waterfowl, cranes, shorebirds and songbirds.

The Caprock WHA, encompassing about 260,500 acres of public land,) is primarily within the shinnery oak-dune community. The lesser prairie chicken, dunes sagebrush lizard, mule deer and pronghorn antelope are species of concern in the WHA.

The Macho WHA, covering about 635,000 acres of public land, is within the short grass prairie portion of the resource area. It contains preferred habitat of pronghorn antelope. The principal management goal of the WHA is to restore healthy populations of antelope.

WILDLIFE REFUGE

The Bitter Lake National Wildlife Refuge is about five miles east of Roswell. It is administered by the U.S. Fish and Wildlife Service, but Roswell Resource Area staff coordinates with the Service on activities that take place near the refuge's boundaries.

HABITAT IMPROVEMENTS

There are about 60 habitat improvement projects in the Roswell Resource Area (see Map 45). These are projects to enhance habitat for wildlife purposes. The projects include, but are not limited to, water guzzlers, inverted umbrellas, exclusion fences for key habitat, prescribed fires, juniper and salt cedar removals, and tree plantings. The majority of the improvements are within the WHAs.

HAZARDOUS OR SOLID WASTES

There are no known hazardous waste sites in the Roswell Resource Area. There are no open landfills on the public lands within the Roswell Resource Area.

FIRE

Fire is considered to be a natural part of the ecosystems of southeastern New Mexico. Prior to extensive grazing and modern fire suppression techniques, large lighting-caused fires were a dominant force in maintaining the plant communities of the region. Because of the abundance of roads, ranches and railroads, human-caused fires are now common. Humans cause about 48 percent of the resource area's fires and are responsible for about 59 percent of the acreage burned. Most of these fires result from debris burning, equipment use, smoking, or arson.

Lightning causes about 52 percent of the fires in the resource area, and is responsible for about 41 percent of the acreage burned. Fires can occur at any time of the year. The heaviest occurrence of wildfires (fire season) is from late March through July. Most fires caused by lightning occur from April through July.

Prescribed fire plays an important role in vegetation management in the resource area. Over the last five years approximately 1,000 acres annually have been treated with prescribed fire.

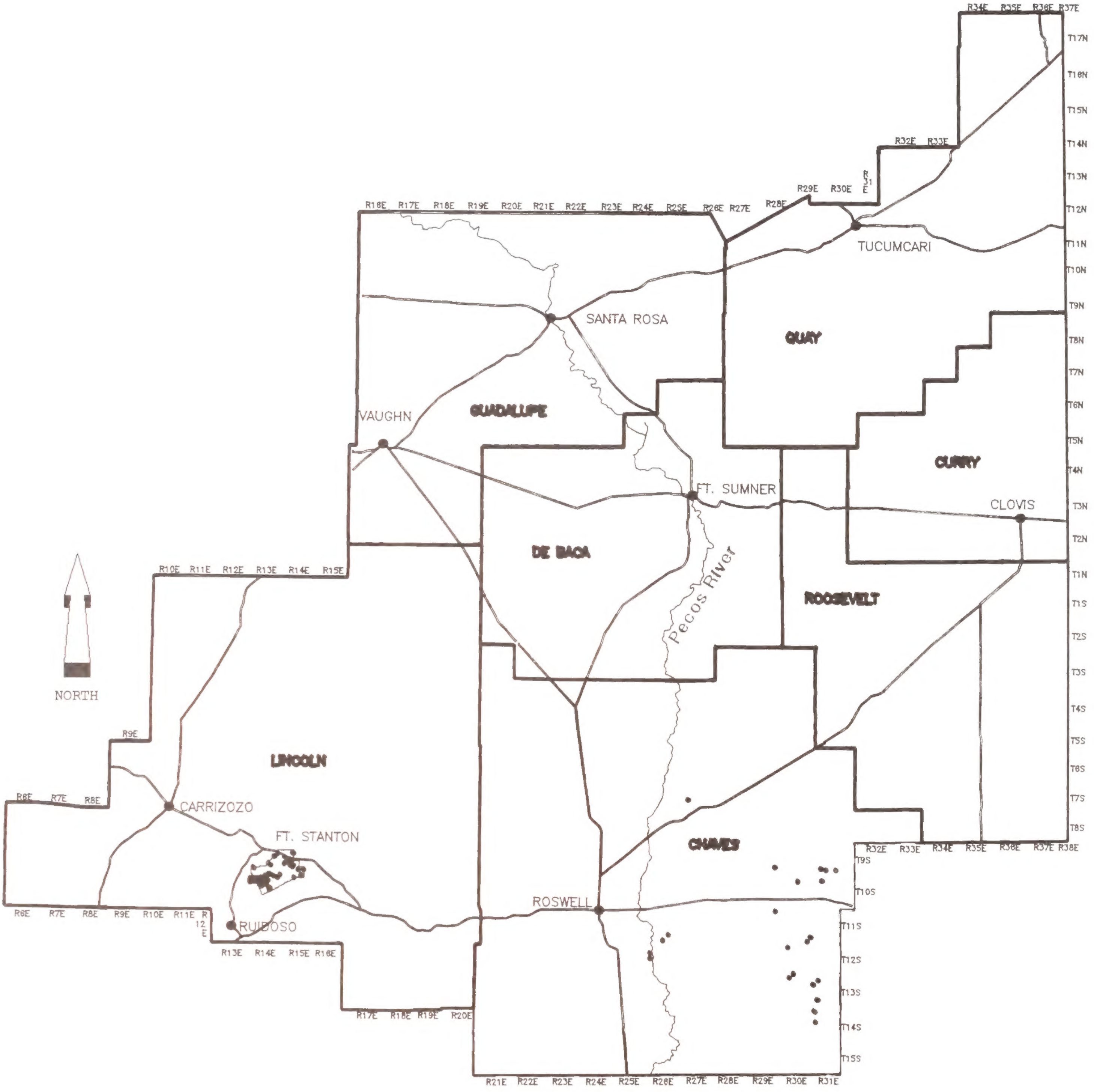
SOCIO-ECONOMICS SPECIFIC TO THE ROSWELL RESOURCE AREA

Socio-economic factors related to oil and gas resources and those discussed in the context of the Roswell District are at the beginning of this chapter.

REVENUES GENERATED FROM GRAZING, RECREATION AND MINERAL MATERIAL DISPOSAL ACTIVITIES

Livestock operators pay for grazing privileges on the public lands. In fiscal year 1993, grazing activities

● - Habitat Improvement



SCALE
1/2" = 13.5 Miles
BLM-Roswell District, 1994

MAP 45
WILDLIFE HABITAT IMPROVEMENT LOCATIONS
Roswell Resource Area

generated about $620,000 in federal receipts. Recreationists pay user fees for certain recreational activities within the resource area. The Roswell Resource Area received about $28,000 in revenues from recreationists in 1993. The resource area received an average of $24,887 in revenues per year from mineral material sales in the period from 1976-1993. Local and state government agencies received an average of $75,000 in free use mineral materials per year over the same 18-year period.

PAYMENT IN LIEU OF TAXES

New Mexico received over $10 million in 1991 for tax-exempt lands (U. S. Bureau of Land Management, Division of Finances, 1991). Local governments across the country receive the payments under the Payments In Lieu of Taxes (PILT) Law of 1976. In 1993, the following PILT payment were made: Chaves County, $855,399; Lincoln County, $319,618; Guadalupe County, $36,122; De Baca County, $24,340; Roosevelt County, $7,316; Quay County, $1,299. Curry County did not receive a PILT payment in 1993.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Following are discussions of affected resources within the proposed areas of critical environmental concern (ACECs). Appendix 13 describes the relevance and importance criteria for each ACEC. Appendix 11 contains the description of the plant communities. Descriptions of the recreation opportunity spectrum and visual resource management classes are in the Glossary. Map 15 (in Chapter 2) shows the locations of the proposed ACECs.

FORT STANTON

Fort Stanton is located 65 miles northwest of Roswell. The original boundary of Fort Stanton enclosed 27,622 acres of federal land. The Village of Ruidoso owns 1,666 acres of land at Fort Stanton and 1,326 acres are owned by the State of New Mexico.

The area is classified as having low potential for oil and gas occurrence and is closed to oil and gas leasing. The entire area has potential for the occurrence of gypsum, limestone and dolomite. Fort Stanton is closed to all leasable and salable mineral disposals and is withdrawn from locatable mineral entry. Nine rights-of-way have been authorized at Fort Stanton for access roads, power lines, and pipelines. Approximately 1.5 miles of public land along Lincoln County Road B-006 near Sierra Blanca Airport is designated as a right-of-way corridor.

Most of Fort Stanton lies within the Rio Bonito watershed. Approximately 2,800 acres of the area drains southerly to the Rio Ruidoso. The Rio Bonito originates in the Sacramento Mountains and is impounded at Bonito Lake where water is diverted. Below the lake, the river gains water from springs and some surface flow, but has additional diversions for irrigation. At its confluence with the Rio Ruidoso, the Rio Bonito has a mean annual discharge of approximately 10 cfs (Hall 1964), but is often dry in the lower ten miles due to seepage losses. The annual maximum discharge (at the crossing of U.S. Highway 380) was 4,100 cfs on May 17, 1979. Ground water is recharged primarily by precipitation in the Sacramento Mountains, and by drainage losses. Ground water depth ranges from less than 50 feet in drainages to more than 200 feet on mesas.

Soils are derived from limestone and dolomite, or undifferentiated dolomite, sandstone, siltstone, and shales (Allen and Jones 1952). Mesa tops typically have deep, well-drained, calcareous soils with surface textures ranging from loam to clay loam. Hillsides commonly have shallow soils over limestone, with surface textures ranging from clay loam to sandy loam and a large amount of coarse fragments. Alluvial valley bottoms have deep, well-drained soils with surface textures ranging from loam to silty clay loam (Wood and Wood 1988). Mesas show signs of active sheet erosion. Without adequate vegetative cover, mesas have a moderate to high potential for wind or water erosion. Hillsides and valley bottoms show signs of gully, rill, and sheet erosion. The potential for water erosion is moderate to high, and for wind erosion is slight to moderate.

Fort Stanton provides habitat for the federally-listed Kuenzler Hedgehog Cactus. Off-road vehicle use is restricted in some areas of Fort Stanton in order to protect habitat for the cactus. There are 9,201 acres in the grassland plant community, 13,888 acres in the pinon-juniper plant community, and 4,533 acres in the drainages/draws/canyons plant community. Riparian lands are found along the Rio Bonito and Salado Creek. Prescribed burns, mechanical and chemical control, and firewood sales are used for vegetation management at Fort Stanton. Grazing on Fort Stanton is currently authorized for vegetation management purposes on an annual basis, for a period of nine months or less in selected pastures.

Fort Stanton Cave provides habitat for at least four different species of bats, one of which has potential to be federally listed as threatened or endangered. These bats are extremely susceptible to death from human disturbance during their hibernation period. Fort Stanton provides diverse habitat for a total of 151 species of birds, and 38 species of mammals. These include non-game species and upland game species. Some big game species that inhabit the area include black bear, mountain lion, mule deer, elk and antelope.

Fort Stanton also provides habitat for nine species of fish. Species found at Fort Stanton are the Rio Grande sucker, brook trout, rainbow trout, fathead minnow, Rio Grande chub, and longnose dace.

The majority of the Fort Stanton area (23,521 acres) is classified as rural under the Recreation Opportunity Spectrum (ROS) analysis process; 4,101 acres are classified as roaded natural. The visual resources within the area are categorized as Class II (9,529 acres), Class III (10,176 acres) and Class IV (7,917 acres).

Fort Stanton provides a wide variety of recreational uses, including horseback trails, mountain bike trails, camping, hunting, fishing, hiking, sightseeing, caving, rockhounding, and back country driving. Developed recreation facilities at Fort Stanton are inadequate to meet the growing public demand. Some recreational activities have resulted in a loss of wildlife and riparian habitat, and the direct disturbance of wildlife and Kuenzler cactus habitat.

Fort Stanton has several caves within its boundary, all of which have fragile resources that can be easily damaged or destroyed by uncontrolled activities. Fort Stanton Cave, the fourth longest cave in New Mexico, is approximately eight miles long and has the highest visitation of any cave in the resource area. Fort Stanton Cave is a National Natural Landmark and was the first cave to be surveyed by the federal government. The survey was made in 1877. Feather Cave, another of the more prominent caves at Fort Stanton, is closed to visitor use to protect a bat hibernaculum and to protect the public from safety hazards associated with breakdown and histoplasmosis. Other caves located at Fort Stanton include Waldo 85, Cactus, Beth's, Fly, Agogino, Crevice, and Unknown Soldier. A high potential for the occurrence of cave or karst features exists on 14,459 acres at Fort Stanton. Except for about 10 acres with moderate potential for occurrence, the remaining acres are within the low potential category.

Fort Stanton contains both prehistoric and historic cultural values. Included in the cultural sites found in this area are pictographs, petroglyphs, historic sites, prehistoric sites (pithouses and above ground pueblos), prehistoric camping areas, historic artifacts (bullets, bottles, etc.), and prehistoric ceremonial and habitation caves.

OVERFLOW WETLANDS

The Overflow Wetlands area is located approximately 16 miles southeast of Roswell. The boundary of the Overflow Wetlands encloses 6,800 acres of land, including 2,987 acres of BLM surface.

The area has high potential for oil and gas occurrence and is open to leasing. The 870-acre wetland area is open to leasing with a no surface occupancy restriction. The entire area has the potential for the occurrence of uranium, vanadium, and soft caliche. The Overflow Wetlands area is open to all leasable, salable, and locatable mineral disposal.

Four rights-of-way have been authorized in the Overflow Wetlands for access roads, power lines, and pipelines.

Soils differ between the Pecos River floodplain, and the wetlands and surrounding uplands. The floodplain is characterized primarily by the Vinton-Glendale association adjacent to the river, and the Glendale fine sandy loam and Pecos silty clay loam successively higher on the floodplain. The Vinton-Glendale association is deep, well drained, and occasionally flooded. The Glendale and Pecos soils are rarely flooded. All three floodplain soils were formed in stratified alluvium, and have slopes from 0 percent to 1 percent. Runoff is generally slow, and the hazard of water erosion is slight to moderate. The hazard of soil blowing is moderate.

The wetlands proper consists primarily of the Holloman-Gypsum land complex with 0 percent to 3 percent slopes. It is nearly level and well drained. Generally, Holloman loam overlays gypsiferous bedrock to a depth of 0 inches to 20 inches. Runoff is rapid on the Gypsum land and medium on the Holloman soil. The hazard of water erosion is moderate on both. The hazard of soil blowing is moderate on the Holloman soil, but severe on the Gypsum. Upland soils surrounding the wetlands also consist of the Holloman-Gypsum land complex, but have slopes of 3 percent to 5 percent. Breaks between the wetlands and uplands are similar soils with slopes of 30 percent to 50 percent. On the breaks, runoff is rapid, and the hazard of water erosion is severe. The hazard of soil blowing is moderate.

The mean annual discharge of the Pecos River in the reach of the proposed ACEC is approximately 200 cubic feet per second (cfs). The instantaneous peak flow with a ten-year return period is approximately 660 cfs. The instantaneous peak flow on record is approximately 47,000 cfs, and periods of zero flows have occurred (U.S. Geological Survey 1992).

The proposed ACEC encompasses a reach of the Pecos River for which the New Mexico Water Quality Control Commission (1992) has identified irrigation, livestock and wildlife watering, secondary contact recreation, and warm water fishery as designated uses. The warm water fishery is the only use not fully supported. Probable causes of nonsupport include metals (copper, iron, lead, and mercury are toxic at chronic levels), dissolved oxygen levels, un-ionized ammonia, total dissolved solids, reduction of riparian vegetation, streambank destabilization, and siltation. Probable sources of nonsupport include rangeland agriculture and irrigation return flows.

The wetlands receive rainfall runoff and discharge from Lea Lake at Bottomless Lakes State Park. Flow from Lea Lake is estimated to be approximately five cubic feet per second and relatively steady. It is believed that losses from evaporation lead to elevated levels of dissolved solids, though concentrations have not been systematically monitored.

There are 2,750 acres in the grassland plant community, 986 acres in the mixed desert shrub plant community, and 501 acres in the drainages/draws/canyons plant community. The remaining 2,796 acres have not been mapped. Portions of allotments 5041, 5060, 5062, and 5069 are in the Overflow Wetlands and are permitted for yearlong livestock grazing.

This wetland habitat is frequented by thousands of waterfowl wintering in the Pecos River valley. Major waterfowl species using the area include mallards, pintails, widgeons, teal, canvasbacks, redheads, shovelers, sandhill cranes, snow geese, and many other waterfowl species. Many game and non-game species occasionally occupy the area. The wetland is inhabited by the Pecos Pupfish (*Cyprinodon pecosensis*), a federal Category 1 candidate and state-listed endangered species.

The majority of the area (3,961 acres) is classified as rural under the ROS analysis process, 276 acres are classified as roaded natural, and the remaining 2,796 acres are unclassified. The visual resources within the area are categorized as Class I, 29 acres; Class II, 5,768 acres: Class III, 229 acres; and Class IV, 706 acres. Recreational opportunities in the area include sightseeing, hunting, trapping, fishing and wildlife viewing. The Overflow Wetlands area has high potential for caves and karst on about 4,871 acres and moderate potential for the remaining acreage.

Shifting dunes of sand provide important wildlife habitat and opportunities for recreation.

MESCALERO SANDS

The Mescalero Sands area is located 36 miles east of Roswell. The area encompasses approximately 10,007 acres. Of that amount, 7,888 acres are federal surface and 7,931 acres are federal mineral estate, 1,799 acres are state-owned surface and 1,439 acres are state-owned mineral estate, and 320 acres of surface and 637 acres of mineral estate are privately owned. The area also contains the Mescalero Sands NNL which includes 2,671 acres of federal land.

The area has high potential for oil and gas occurrence. Of the federal mineral estate, 6,892 acres are currently covered by oil and gas leases. The entire area has potential for the occurrence of uranium, vanadium and soft caliche. Mescalero Sands is open to all leasable and salable mineral disposals; 6,617 acres have been withdrawn from locatable mineral entry, the majority of which is contained within the boundary of the proposed ACEC.

Soils of the proposed ACEC consist of large areas of unstable dune soils surrounded by soils of the Roswell-Jalmar complex. The dunes are made up of fine sand that is free to drift with the wind. The dunes are mostly barren of vegetation due to low precipitation and blowing sand. The Roswell-Jalmar complex mainly consists of fine sand, also. The Roswell soil is gently undulating and deep; the Jalmar soil is nearly level and exists in depressions. On both the dune soils and the Roswell-Jalmar complex soils, runoff is slow and only a slight hazard of water erosion exists. The hazard of wind erosion is severe (USDA Soil Conservation Service 1980).

There is no surface drainage from the area of the proposed ACEC. Surface runoff flows to sinks where it evaporates or infiltrates the soil. Depth to ground water is approximately 400 feet and the water is generally of poor quality (Geohydrology Associates Inc., 1978).

Plant communities in the area include 9,675 acres of the shinnery oak-dune community and 332 acres of the drainages/draws/canyons community. Within the shinnery oak-dune community, 417 acres have been treated to control shinnery oak.

Portions of allotments 5051, 5053, 5063, and 5069 are in within the Mescalero Sands and are permitted for yearlong livestock grazing. There are 1,839 acres within the Mescalero Sands that are part of the existing Outstanding Natural Area and are closed to livestock grazing.

Mescalero Sands' important biological values include booming grounds for the lesser prairie chicken, habitat for the state-listed dunes sagebrush lizard, a small population of white-tailed deer, and numerous raptors. Game species occupying the area include mule deer, pronghorn antelope, bobwhite and scaled quail, and mourning dove.

The majority of the 8,061-acre Mescalero Sands area is classified as rural under the ROS analysis process; 1,946 acres are classified as roaded natural. The visual resources in the area are categorized as Class II.

Recreational opportunities in the area include sightseeing, hunting, trapping, and wildlife and plant viewing.

NORTH PECOS RIVER

The North Pecos River area is located along the Pecos River beginning at the De Baca and Chaves county line, 38 miles northeast of Roswell. The area encompasses approximately 6,500 acres. Of that amount, 3,362 acres are federal surface and 4,202 are federal mineral estate, 1,160 acres are state surface and mineral estate, and 1,180 acres of surface and 1,040 acres of mineral estate are privately owned.

The area has high potential for oil and gas occurrence. Of the federal mineral estate, 3,724 acres are covered by oil and gas leases. Surface use restrictions are in effect on about 1,920 acres of riparian habitat in the Pecos River floodplain. The entire area has potential for the occurrence of uranium, vanadium and soft caliche. The North Pecos River area is open to all leasable, salable, and locatable mineral disposals.

Soils in the proposed ACEC consist primarily of Ustifluvents in the floodplains and Gallen very gravelly loam soils on stream terraces. The Ustifluvents are formed in alluvium and are deep, somewhat poorly drained, and frequently flooded. The surface layer is commonly a loam about 12 inches thick. The Gallen soil formed in calcareous alluvium. It is deep and well-drained. The surface layer is typically a very gravelly loam about four inches thick. The hazard of soil blowing is high on the Ustifluvents and slight on the Gallen soil. Runoff is medium and the hazard of water erosion is moderate on both soils. The surrounding uplands are highly susceptible to soil loss (New Mexico Soil and Water Conservation Division 1976).

The mean annual discharge of the Pecos River in the reach of the proposed ACEC is approximately 190 cubic feet per second (cfs). The instantaneous peak flow with a ten-year return period is approximately 710 cfs. The instantaneous peak flow on record is approximately 44,000 cfs, and periods of zero flows have occurred (U.S. Geological Survey 1992).

The proposed ACEC encompasses a reach of the Pecos River for which the New Mexico Water Quality Control Commission (1992) has identified fish culture, irrigation, limited warm water fishery, livestock and wildlife watering, and secondary contact recreation as designated uses. The limited warm water fishery is the only use not fully supported. Probable causes of nonsupport include metals (silver and mercury are toxic at chronic levels), reduction of riparian vegetation, streambank destabilization, and siltation. Probable sources of nonsupport include rangeland agriculture and hydromodification.

There are 2,232 acres in the grassland plant community, 1,214 acres in the mixed desert shrub plant community, and 1,859 acres in the drainage/draws/canyons plant community. The remaining 1,006 acres have not been mapped. Prescribed fires have been conducted along portions of the riparian habitat for vegetation control and to promote plant diversity. Portions of allotments 4038, 4039, 4538 and 5001 are within the North Pecos River area and are permitted for yearlong livestock grazing.

This area contains important biological values. These values include habitat for several fish on federal threatened and state endangered species lists, unique big-game and non-game habitat and pristine river conditions. The riparian habitat and associated upland breaks support a variety of wildlife species. Some of these include mule deer, pronghorn antelope, quail, dove, pheasant, catfish and other fish species, numerous raptors, reptiles, predators and other nongame species.

The majority of the North Pecos River area (3,416 acres) is classified as rural under the ROS analysis process. Another 1,981 acres are classified as roaded natural and the remaining 1,005 acres are unclassified. The visual resources in the area are categorized as: Class III, 6,200 acres; and Class IV, 360 acres. Recreational opportunities in the area include sightseeing, hunting, trapping, and fishing.

ROSWELL CAVE COMPLEX

Caves are features of karst topography, which is characterized by vertical and underground drainage forming where highly soluble rock is dissolved by naturally acidic waters. Well-defined surface drainage is typically uncommon in these areas because infiltration and subsurface drainage is so rapid. The rapid movement of water makes karst systems particularly vulnerable to ground water contamination.

The proposed Roswell Cave Complex ACEC contains nine cave systems: Angora-Corn, Bat Hole Cave, Coachwhip Cave, Crockett Cave, Crystal Caverns-Devil's Well, Martin-Antelope Gyp, Millrace Cave, Torgac Cave and Zia Christine Cave.

Soils in the ACEC are commonly derived from limestone or alluvium derived dominantly from limestone. They are well-drained, vary from very shallow to very deep, and vary from nearly level to extremely steep.

Angora-Corn System

The Angora-Corn System area, located approximately 16 miles north-northeast of Roswell and encompassing approximately 4,860 acres of federal surface and mineral estate, is an extensive series of interconnected caves. Little Angora Goat Maze Cave is a joint-controlled pattern of horizontal and vertical passages, highly accessible for research and recreational purposes.

Corn Sinkhole is a 65-foot deep pit with a cave at its bottom leading into gypsum strata. It supports a bat hibernaculum of about 400 Townsend's western big-eared bats (*Plecotus townsendii*). Other caves in the system have bat populations, but their populations have not been estimated.

Sinkholes of this system contain household and industrial refuse. The 30-foot-deep Outhouse Sinkhole, for example, has been used by area residents and industry to dump car batteries, sheep dip cans, pesticide cans, refrigerators, unidentified burned materials, plastics and rubber.

The area has high potential for oil and gas occurrence. Currently the entire area is covered by oil and gas leases. The entire area has potential for the occurrence of uranium, vanadium and soft caliche.

This area contains portions of three rights-of-way: NM67268, T. 8 S., R. 23 E., Section 11; NM77769, T. 8 S., R. 23 E., Section 15; NM18599, T. 8 S., R. 23 E., Section 22.

Approximately 4,100 acres of this area are in the mixed desert shrub plant community. The remaining 760 acres are in the grassland plant community. Portions of allotments 4021, 4022, and 4023 are encompassed by this area.

The Angora-Corn Cave System is within the Macho Wildlife Habitat Area. Species inhabiting the area may include quail, dove, raptors, mule deer and reptiles. Use of this area by pronghorn antelope is limited, since the majority of the livestock on these allotments are goats and sheep.

The majority of this area (4,540 acres) is classified as rural under the ROS analysis process; the remaining 320 acres are roaded natural. Recreational uses in the area include hunting and caving. The visual resources in the area are categorized as: Class III, 1,890 acres; and Class IV, 2,970 acres.

Unique cultural resources are directly related to this system. The area has worked (reduction) lithic sites, possibly dating to the Archaic. In the surrounding area, there have been 3 sites surveyed, containing prehistoric lithic scatters.

Bat Hole Cave

The Bat Hole cave area encompasses approximately 40 acres of federal surface and mineral estate. It is located adjacent to the Bitter Lake National Wildlife Refuge, approximately 8 miles east of Roswell. This cave has a sheer vertical entrance 87 feet deep. Circling the rim of the entry pit are large, loose gypsum boulders which are dangerous to rappellers.

This area has high potential for oil and gas occurrence. Currently the entire area is covered by oil and gas leases. The entire area has potential for the occurrence of uranium and vanadium.

Approximately 34 acres of this area are in the mixed desert shrub plant community. The remaining 6 acres are in the grassland plant community. This area is entirely within allotment 5094. Cattle are licensed to graze this allotment, yearlong.

The wildlife associated with Bat Hole Cave includes quail, dove, raptors, mule deer and reptiles. Species such as the Mexican free tail bat (*Tadarida brasiliensis*), Townsend's western big-eared bat (*Plecotus townsendii*), common cave bat (*Myotis velifer*), and Western Pipistrelle (*Pipistrellus hesperus*) inhabit the cave. Bat Cave has a significant summer bat nursery and roost of Mexican free tail bats. A population of 9,000 bats was counted on August 10, 1993. This colony is one of the largest Mexican free tail bat populations in the resource area, as well as in the western United States. Great horned owls, hawks and other bird species nest in the cave entrance.

This area is classified as rural under the ROS analysis process. Recreational uses in the area include hunting and caving. The visual resources in the area are categorized as: Class I, 16 acres; and Class II, 24 acres.

Coachwhip Cave

The Coachwhip Cave area, located approximately 50 miles north-northwest of Roswell, encompasses approximately 614 acres of federal surface and mineral estate. Coachwhip Cave has a surveyed length of 1,500 feet and depth of approximately 55 feet. It is a moderate-sized gypsum cave consisting of three levels-- two upper mazes and a lower small trunk passage.

Coachwhip Cave is regionally unique in that it is comprised of a multi-directional maze with long truncated passages. Coachwhip Cave becomes extremely dangerous when large volumes of water enter it during rain storms. The cave shows very little human impact and would make an excellent "gyp" cave case study for the purpose of developing future management of the caves in the area.

This area has high potential for oil and gas occurrence. Currently, the entire area is covered by oil and gas leases. The entire area has potential for the occurrence of uranium and vanadium.

The entire area is in the grassland community. The entire area lies within allotment 2091 and cattle are licensed to graze this allotment, yearlong.

This area is classified as rural under the ROS analysis process. Recreational uses in the area include hunting and caving. The visual resources for this area are designated as Class III.

Crockett Cave

The Crockett Cave area encompasses approximately 640 acres of federal surface and mineral estate. It is located adjacent to the Carrizozo Lava Flow, approximately 8 miles west of Carrizozo.

Crockett Cave is approximately 3,800 feet long and 80 feet deep. The cave is comprised of several large, interconnected rooms. It contains unique and rare calcite boxwork formations, and gypsum stalactites and flowers.

This area has moderate potential for oil and gas occurrence; the area is not leased. The entire area has potential for the occurrence of gypsum, uranium, iron skarns, gold, manganese, copper, and molybdenum.

There are 382 acres in the grassland plant community, 241 acres in the drainages/draws/canyons plant community; and the remaining 17 acres in the mixed shrub malpais plant community. This area is entirely within allotment

3076. Cattle are licensed to graze this allotment, yearlong.

The wildlife associated with the Crockett Cave area includes quail, dove, raptors, mule deer, antelope, reptiles and non-game species. Crockett Cave serves as a bat hibernacula during the winter months. Species such as Townsend's western big-eared bat (*Plecotus townsendii*), common cave bat (*Myotis velifer*), and western pipistrelle (*Pipistrellus hesperus*) inhabit the cave.

Approximately 13 acres of this area is classified as semi-primitive nonmotorized and the remaining 627 acres as rural under the ROS analysis process. Recreational uses in the area include hunting and caving. The visual resources within the area are categorized as: Class I, 548 acres; and Class IV, 95 acres.

Crystal Caverns-Devil's Well

The Crystal Caverns-Devil's Well area, located approximately 50 miles north-northwest of Roswell, encompasses approximately 6,400 acres. Of that amount, 2,280 acres are federal surface and 5,120 acres are federal mineral estate, and 4,120 acres of surface and 1,280 acres of mineral estate are privately owned.

The Crystal Caverns System is an extensive cave system approximately 12,485 feet in length with a depth of 331 feet. Crystal Caverns is one of the longest and deepest gypsum caves in the United States.

Devil's Well is a large, deep sink hole that drains an extensive surface area. The system becomes extremely dangerous during runoff from rain storms. The site contains early archaic (from 5000 B.C.) and possibly paleoindian artifacts.

This area has high potential for oil and gas occurrence. The 5,120 acres of mineral estate is not leased. The entire area has potential for the occurrence of uranium, vanadium and caliche.

This area contains portions of five rights-of-way: NM19260, T. 3 S., R. 21 E., Section 17; NM29081, T. 3 S., R. 21 E., Section 14; NM16556, T. 3 S., R. 21 E., Section 14; NM36230, T. 3 S., R. 21 E., Section 14; and an unnumbered railroad in T. 3 S., R. 21 E., Sections 10, 14 and 15.

There are 5,823 acres in the grassland plant community, and 577 acres in the mixed desert shrub plant community. The area lies within allotments 2070 and 2071 and cattle are licensed to graze these allotments, yearlong.

The Crystal Caverns-Devil's Well area is in the Macho Wildlife Habitat Area. Species inhabiting the area may include quail, dove, raptors, mule deer, reptiles and antelope. The Crystal Caverns-Devil's Well system provides significant bat hibernacula during the winter months. Hibernating populations average about 3,000. Species inhabiting the system are Townsend's western big-eared bat (*Plecotus townsendii*), common cave bat (*Myotis velifer*), small-footed bat (*Myotis ciliolabrum*), and eastern pipestrelle (*Pipistrellus subflavus*).

Of the 6,400 acres associated with these caves, 1,395 acres are classified as rural under the ROS analysis process. The remaining 5,005 acres are unclassified. Recreational uses in the area include hunting and caving. The visual resources within the area are categorized as Class III, 1,680 acres and Class IV, 4,720 acres.

Martin-Antelope Gyp System

The Martin-Antelope Gyp System area, located approximately 65 miles north-northwest of Roswell, encompasses approximately 2,400 acres. Of that amount, 2,080 acres are federal surface and 2,080 acres are federal mineral estate, and 320 acres of surface and mineral estate are in private ownership.

The Martin-Antelope Gyp Cave System consists of Martin, Antelope Gyp, Dusty North, Dusty South and Hanging Yucca caves. Martin Cave is 4,498 feet in length. Antelope Gyp is 1,937 feet long and 91 feet deep. Dusty North is 255 feet long and 10 feet deep, Dusty South is 148 feet long and 23 feet deep, and Hanging Yucca is 100 feet long and 40 feet deep.

This area has high potential for oil and gas occurrence. Currently, the 5,120 acres of mineral estate are not leased. The entire area has potential for the occurrence of uranium, vanadium and caliche. This area contains portions of one right-of-way: NM55771, T. 5 S., R. 22 E., Section 8.

There are 5,823 acres in the grassland plant community and 577 acres in the mixed desert shrub plant community. The area lies within allotments 2070 and 2071 and cattle are licensed to graze thse allotments, yearlong.

The area is in the Macho Wildlife Habitat Area. Species inhabiting the area may include quail, dove, raptors, mule deer, reptiles and antelope. The Martin-Antelope Gyp Cave System caves provide significant bat hibernacula during the winter months. Species such as the western big-eared bat (*Placates townsendii*), common cave bat (*Myotis velifer*), and western pipistrelle (*Pipistrellus Hesperus*) inhabit the Martin-Antelope Gyp Cave system and caves adjacent to the system. There are no estimates of bat populations in these caves. A rare breeding population of neotenic tiger salamanders inhabits the cave system. Other troglobitic species inhabiting the cave system include water beetles, blood-sucking fly, ticks, millipedes, spiders, rhadine beetles, pseudoscorpions, dipluran, centipedes, mites and crickets.

In this area, 1,395 acres are classified as rural under the ROS analysis process. The remainder of the area is unclassified. Recreational uses within the area include hunting and caving. The visual resources within the area are Class III.

A significant archaeological site is associated with Hanging Yucca Cave. This site has several pictographs. Lithic scatters and stone tools have been identified in the surrounding area.

Millrace Cave

The Millrace Cave area encompasses approximately 640 acres: 480 acres are federal surface and mineral estate and 160 acres are private surface and mineral estate. Millrace Cave is located adjacent to the Little Black Peak Lava Flow, approximately 8 miles west of Carrizozo.

Millrace Cave, at 435 deep, is one of the deepest gypsum caves in the United States. It is also unique in that its entrance is in the basaltic surface lava of the Carrizozo Lava Flow. The cave's entrance is located on private land. The majority of the cave's passages lie beneath BLM-managed lands that are in the Little Black Peak and Carrizozo Lava Flow wilderness study areas. The main passage is carved into gypsum formations, known as speleoclasts. Some of the cave has vertical chimneys where ropes are used for the safety of the cavers. Interesting serpentine passages have developed due to high-volume, high-pressure solutional erosion.

This area has moderate potential for oil and gas occurrence; the area is not leased. The entire area has potential for the occurrence of gypsum, limestone and dolomite.

There are 134 acres in the grassland plant community and 506 acres in the mixed shrub malpais plant community. This area is within allotments 3077 and 3177. Cattle are licensed to graze these allotments, yearlong.

The wildlife associated with the Millrace Cave area includes quail, dove, raptors, mule deer, antelope, reptiles and non-game species.

Approximately 36 acres of this area are classified as semi-primitive nonmotorized and the remaining 604 acres as rural under the ROS analysis process. Recreational uses in the area include hunting, caving and sightseeing. The visual resources for the entire area are designated Class I.

Torgac Cave

The Torgac Cave area encompasses approximately 640 acres: 480 acres are federal surface and mineral estate and 160 acres are private surface and mineral estate. The cave is located approximately 50 miles northwest of Roswell.

Torgac Cave is designated a National Natural Landmark. It is approximately 2,820 feet in length and 75 feet deep. Included in the cave system is Torgac Annex and other sink holes adjacent to Torgac Cave. Torgac Cave is the world type-site for gypsum stalactites, stalagmites and columns, and contains some of the best examples of those speleothems in the world.

This area has moderate potential for oil and gas occurrence. Of the 480 acres of federal mineral estate, 40 acres are closed to oil and gas leasing. The remaining 440 acres are open for leasing, but are not currently leased. The entire area has potential for the occurrence of gypsum.

The entire area is in the grassland plant community. This area is within allotment 3036 and cattle are licensed to graze this allotment, yearlong.

The Torgac Cave area is in the Macho Wildlife Habitat Area. Species inhabiting the area may include quail, dove, raptors, mule deer, reptiles and antelope. Torgac Cave serves as a significant bat hibernaculum for a population of 4,000 bats during the winter and as a roost for a population of 2,000 bats during the summer. The cave houses the largest hibernaculum on BLM-administered lands in New Mexico. Species occupying the cave include Townsend's western big-eared bat (*Plecotus townsendii*), small-footed myotis (*Myotis celiolabrum*), common cave bat (*Myotis velifer incautus*), and big brown bat (*Eptesius fuscus*).

The Torgac Cave area is classified as rural under the ROS analysis system. Recreational uses in the area include hunting and caving. The visual resources for the entire area are designated Class IV. A recorded but unstudied archaeological site is located within the area.

Zia Christine Cave

The Zia Christine Cave area encompasses approximately 640 acres: 480 acres of federal surface and mineral estate, and 160 acres of private surface. The cave is located approximately 70 miles west of Roswell.

Zia Christine Cave is about 2,000 feet long and 150 feet deep. Located in close proximity to the igneous Jicarilla Mountains, the development of Zia Christine appears to have been controlled by tectonic forces, making the cave unique regionally, and possibly on a national basis.

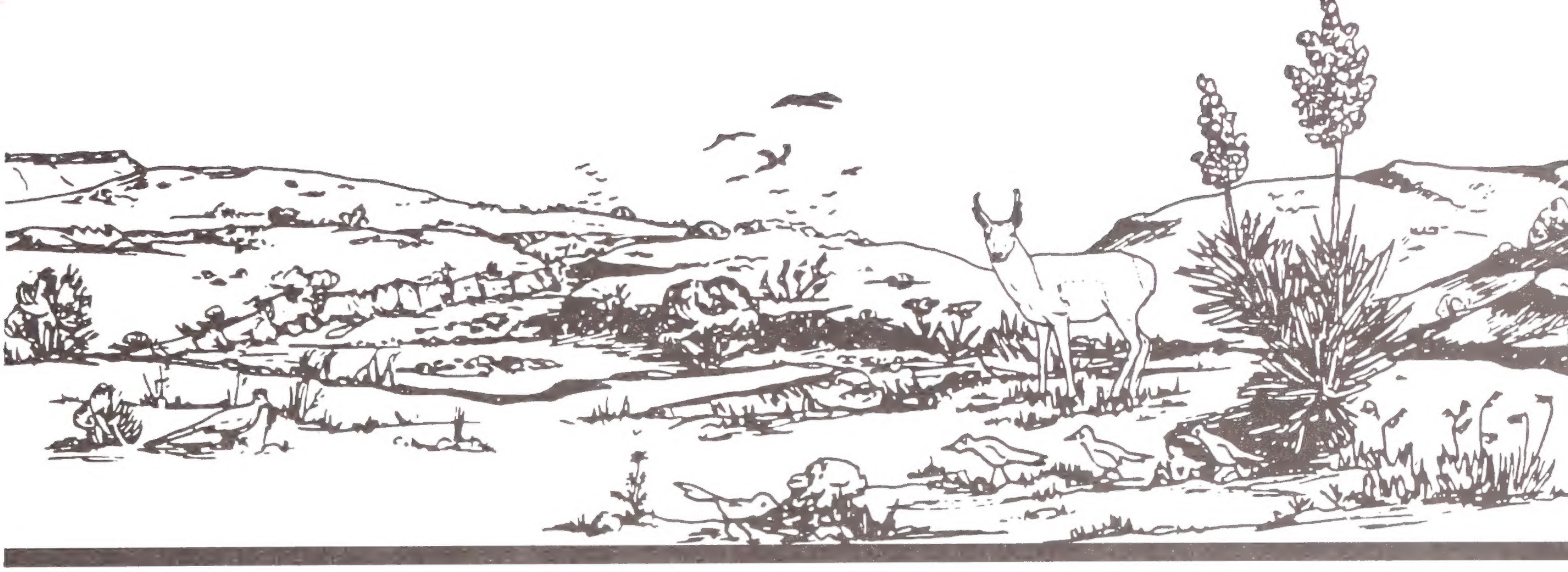
Within the cave are very unique and beautiful mineral and cave formations. One room in the cave contains large Torgac-type gypsum stalactites. Two other rooms contain selenite needles, frostwork and selenite stalactites.

This area has low potential for oil and gas occurrence; the area is not leased. The entire area has potential for the occurrence of gypsum, uranium and vanadium.

There are 496 acres in the grassland plant community and 144 acres in the pinon-juniper plant community. This area is in allotment 3028, and cattle are licensed to graze this allotment, yearlong.

The wildlife associated with the Zia Christine Cave area includes quail, dove, raptors, mule deer, antelope, reptiles and non-game species. The cave is a bat hibernaculum, but the species of bats using the cave and their populations are unknown.

Approximately 211 acres of this area are classified as roaded natural and 573 acres as rural under the ROS analysis process. Recreational uses in the area include hunting and caving. The visual resources for the entire area are Class IV.



CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter presents the environmental consequences of management actions described in Chapter 2. Both beneficial and adverse effects (impacts) are described. The environmental consequences on some resources and resource uses were not specifically identified as planning issues. However, impacts to those resources and uses are analyzed and discussed if they would be caused by an action proposed in one or more of the alternatives. In many cases, minimal or insignificant impacts are not specifically addressed. An effort was made to concentrate on the significant impacts of proposed actions.

Impacts described in this chapter are estimates of effect based on the alternatives. In some cases, existing data were used; in others, very little data were available. Lack of data contributes a degree of uncertainty to the impact estimates. In many cases, the analysis includes professional judgements and projections of anticipated actions and levels of activity with the intent of providing adequate and reasonable comparisons of the effects of the alternatives.

Assumptions used in analyzing the environmental consequences are described in Appendix 18. The assumptions are based on previous events, experience of RMP team members, and knowledge of the resources in the planning area.

This chapter is arranged so that the impacts of Management Common to All Alternatives and all five alternatives are presented for each resource program or topic. For example, the impacts to wildlife habitat from Management Common to All Alternatives and from all activities proposed in the five alternatives are discussed in the same section. The topics discussed in the section on wildlife habitat are grouped so that the effects of all facets of mineral activity on wildlife habitat are together, as are the effects of all facets of recreation activity, and so on. The five ACECs proposed in this plan are treated as separate resource programs for the purpose of describing impacts. The impacts to ACECs are arranged as described above. Impacts associated with activities in each ACEC are the same as those identified for similar actions outside the ACEC, unless otherwise noted.

By arranging the chapter in this manner, there are no distinct sections describing impacts by a specific alternative. In this format, the reader will have in one location the complete description of all impacts on a particular resource.

Effects on a given environmental component caused by a particular management action are discussed if they would occur and were considered to be important or significant. Similarly, irreversible or irretrievable commitments of resources, unavoidable adverse effects, and cumulative effects are discussed in the text if they would occur. Otherwise, such effects are not discussed.

Summaries of significant impacts to major resources and resource uses are in Table 3, located with summaries of the alternatives in the section titled "Summary," at the beginning of this document.

OIL AND GAS

The analysis of impacts on oil and gas operations is in a different format from most of the other impact discussions. The primary impacts to oil and gas stem from requirements placed on oil and gas operations. In addition to discussions of impacts resulting from the application of leasing stipulations, there are specific discussions of the Surface Use and Occupancy Requirements (Appendix 3), the Roswell District Conditions of Approval (Appendix 4), and the Practices for Oil and Gas Drilling and Operations in Cave and Karst Areas (Appendix 5).

Unless specified otherwise, impacts described below in this section are considered to apply to both the Carlsbad and Roswell Resource Areas. All cost estimates or amounts are based on data available at the time of this writing. In this analysis, acreage figures and estimates of wells drilled or not drilled are based on the federal mineral estate managed for leasing by the BLM. Some of the acreage shown in discussions of "no leasing" or "no surface occupancy" is leased by the BLM, but lies beneath surface managed by state agencies or other federal agencies, or under privately owned surface. For purposes of this analysis, impacts to oil and gas development are assumed to occur in areas of high or moderate potential for hydrocarbons and would primarily affect BLM-administered lands.

IMPACTS OF MANAGEMENT COMMON TO ALL ALTERNATIVES

Impacts associated with implementation of the Roswell District Standard Conditions of Approval (Appendix 4) would not vary by alternative. The magnitude of impacts would not change over current management, because the requirements in Appendix 4 are comprised primarily of existing standard procedures and operations.

Installing fine mesh netting over open-top tanks, reserve pits, disposal pits, or other open pits, and the installation of heater-treater caps could result in some increased costs to operators. Again, impacts generally would not vary by alternative.

Cultural resource inventories, possible construction delays, and occasional drilling site relocations to avoid cultural sites increase oil and gas well development costs. These costs (averaging approximately $400.00 for a well pad and one-quarter mile of access road), are currently figured in the cost of a standard drilling project and would be the same for all alternatives. Because these practices are currently required, no additional impacts are expected.

The standard practice of avoiding ephemeral and perennial drainages and wetland/riparian areas is currently employed and would not produce additional impacts.

Burying oil and gas pipelines provides the lines with a certain level of protection from vandalism. Burying could also result in increased construction and maintenance costs of up to 15 percent per mile of pipeline, over surface installation, in both the short term and long term.

Impacts associated with managing oil and gas activities on lands on which the surface is administered by other surface management agencies (e.g., U.S. Forest Service, National Park Service) would be the same as those identified for public lands having the same type of management prescriptions (closed to leasing, NSO, CSU, etc.). See Chapter 2 for a description of current and proposed management prescriptions planned by these agencies.

Impacts associated with leasing oil and gas with the Potash Stipulation in the Carlsbad Resource Area's 497,000-acre potash area could result in higher operating costs or preclude oil and gas development at some locations. In other situations, drilling sites may have to be relocated, causing increased project construction costs or making the project cost-prohibitive. In some areas, directional drilling could be required. For a shallow directional well, drilling and completion costs could increase as much as $200,000 over the $350,000-$400,000 cost of a shallow, straight hole. The costs could increase by as much as $700,000 for a deep directional well, over the $525,000-$600,000 cost of a conventional deep well. Operating costs for producing directional wells could also increase by up to 50 percent per well. Directional drilling requirements could make some proposals cost prohibitive. If a well could not be drilled due to this constraint, the company would lose production and revenue, the federal government would lose royalties, and the public would lose a potential energy resource.

Under current interpretation of the Secretary's Order designating the Oil-Potash Area, drilling prohibitions could also result in the loss of federal oil and gas royalties through the unprotected drainage of federal hydrocarbons. The possible loss of federal royalties from drainage could be up to $500,000 per undrilled protective well. In the fiscal year of October 1, 1992 to September 30, 1993, 347 Applications for Permit to Drill (APDs) in the Secretary's Oil Potash Area were received. Of these 347 APDs, 67 were denied, because of conflicts with potash mining.

Impacts to oil and gas activities in the Dark Canyon area have been analyzed in detail in the Final Dark Canyon Environmental Impact Statement. Impacts associated with oil and gas activities in the East Guadalupe Escarpment Wildlife Habitat Area have been analyzed in an environmental analysis prepared by the Carlsbad Resource Area staff.

IMPACTS OF ALTERNATIVES

Projected drilling activity and associated surface disturbance estimates for the Carlsbad and Roswell resource areas are included in Tables A18-1 and A18-2, respectively, in Appendix 18. Impacts associated with continuing to not allow water disposal pits on public land in certain areas could result in increased costs to operators of up to $1.75 per barrel when hauled up to 24 miles to an approved water disposal facility and $2.60 per barrel when hauled from 25 to 52 miles. The costs of doing business could be increased in both the short term and long term.

Under Alternatives A and C, the reclamation of surface disturbance according to existing, standard operating procedures would continue to be practiced. Under Alternatives B, D and E, the revegetation of disturbed areas would be required and could include techniques (such as deeper rips, different seed mixtures, mulching, removal of caliche, and fertilizer application), which would enhance reclamation efforts including the removal of caliche from roads and pads. Surface reclamation in accordance with standard operating procedures could result in costs to operators of up to $1,500 per acre. Under alternative A, this requirement is currently practiced and there should be no additional impacts with the continuation of this practice. Under Alternatives B, D, and E, techniques designed to enhance revegetation would result in increased initial costs, but in the long run should produce savings to operators. Savings would result from having to conduct revegetation efforts only once, whereas using standard techniques has often required repeated reclamation attempts in order to ensure adequate revegetation.

Impacts associated with painting permanent surface facilities or and equipment approved by the BLM are deemed to be negligible, because prudent operators paint their equipment anyway, to protect their investment from the elements. Painting could result in higher short-term costs for operators who normally do not paint their equipment.

The prairie chicken timing and controlled surface use restrictions under Alternative A could make it difficult for a company to react quickly to the sudden changes in market conditions inherent in the oil and gas industry. Operators would be required to coordinate their drilling programs with the timing restrictions in order to plan drilling activities and avoid costly delays. Exceptions to the seasonal restrictions, while sometimes possible, are dependent on uncontrollable factors such as weather and animal distribution, and cannot be assumed. Even though there is a shortened season for drilling wells in these areas, there should still be enough time to efficiently drill. Another impact associated with this drilling season could be finding enough rigs to drill and complete wells during this shortened drilling period. Rig availability is dependent upon many factors, with one uncontrolled factor being regional activity.

NO SURFACE OCCUPANCY STIPULATION

The no surface occupancy (NSO) leasing stipulation would be applied in every case to specific areas, such as the special management areas in the Carlsbad Resource Area, and more generally to features such as wildlife habitat projects, raptor nests and heronries, slopes, and springs and seeps, when needed. These latter areas are described in the Surface Use and Occupancy Requirements, Appendix 3. In the areas affected by the Surface Use and Occupancy Requirements, the NSO stipulation would be implemented on a case-by-case basis for each individual feature following NEPA analysis. The use of the NSO stipulation in these areas in no way indicates that the maximum buffer distance would be implemented in every case. Impacts associated with the implementation of the NSO Stipulation on these areas would be the same as those described for lands having the "blanket" NSO stipulation (e.g., the special management areas).

Under Alternative A, the no surface occupancy stipulation would continue to be applied on 22,329 acres in the RRA, and 95,813 acres in the CRA (less than 1 percent of lands open to oil and gas leasing). When applied to leasing, the NSO stipulation could dissuade bidders from purchasing lease parcels. When applied to approvals, proponents of new development could be caused to relocate drilling projects, thereby increasing construction costs of each project, and in some instances making oil and gas development impossible or cost prohibitive. Some lands may have to be developed through directional well drilling. Of the combined RRA and CRA lands (118,142 acres) open to oil and gas leasing with the NSO stipulation, all are in areas of high or moderate hydrocarbon potential. Over the next twenty years, as many as four wells in the RRA and 116 wells in the CRA may be affected by application of the no surface occupancy requirement. Refer to Table 103 for a summary of the numbers of wells affected by the no surface occupancy requirement. The immediate and long-term effects of no surface occupancy restrictions could include lost production opportunities, increased drilling and production costs, and loss of royalties. Some leases on these lands with the NSO stipulation could also be subject to drainage of hydrocarbons by non-federal wells. In this situation, the lessee would be responsible for payment of lost royalties unless an economic directional well cannot be drilled. If an economic well is not possible, all royalties would be lost.

Under Alternative B, impacts associated with applying the no surface occupancy stipulation would be the same as under Alternative A, except that the stipulation would be applied to 22,034 acres in the RRA and 62,247 acres in the CRA, all in areas of high or moderate hydrocarbon potential. The application of NSO under this alternative would mean that over the next 20 years, as many as three wells in the RRA and 76 wells in the CRA would be affected by the no surface occupancy requirement.

Under Alternative C, impacts associated with applying the no surface occupancy stipulation would be the same as under Alternative A, except that the stipulation would be applied to 56,898 acres in the RRA and 65,007 acres in the CRA. All affected acres in the CRA are in areas of high or moderate hydrocarbon potential. In the RRA, 53,696 of the 56,898 affected acres are in areas of high or moderate potential. The use of NSO under this alternative would mean that over the next 20 years as many as eight wells in the RRA and 79 wells in the CRA would be negatively affected.

TABLE 103
ESTIMATED NUMBERS OF WELLS AFFECTED BY NO SURFACE OCCUPANCY STIPULATIONS, BY ALTERNATIVE

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Roswell Resource Area	4	3	8	6	4
Carlsbad Resource Area	116	76	79	101	99
Total	120	79	87	107	103

Source: BLM files, 1994.

Under Alternative D, impacts associated with applying the no surface occupancy stipulation would be the same as under Alternative A, except that the stipulations would be applied to 37,605 acres in the RRA and 82,667 acres in the CRA, all in areas of high or moderate hydrocarbon potential. The use of NSO under this alternative would mean that over the next 20 years, as many as six wells in the RRA and 101 wells in the CRA would be affected by the no surface occupancy restriction.

Under Alternative E, impacts associated with applying the no surface occupancy stipulation would be the same as under Alternative A, except that the stipulations would be applied to 28,913 acres in the RRA and 81,147 acres in the CRA. Of the 28,913 acres in the RRA, 26,353 acres are in areas with high or moderate hydrocarbon potential. All the affected acreage in the CRA is in areas of high or moderate hydrocarbon potential. The application of NSO under this alternative would mean that over the next 20 years, as many as four wells in the RRA and 99 wells in the CRA would be negatively affected.

OIL AND GAS LEASING CLOSURES

Under Alternative A, 360,352 acres in the RRA and 89,457 acres in the CRA are designated closed to oil and gas leasing. These figures include federal mineral estate leased by the BLM under surface estate managed by other agencies. In some cases, the no-leasing decision was made after leases were issued and the no-leasing decision does not affect those existing leases. Oil and gas exploration and development would continue on existing leases on a case-by-case basis until lease expiration or abandonment. At that time, new leases would not be issued on those areas. Under this alternative, oil and gas development opportunities would continue to be unavailable on areas without prior leases for which the no-leasing decision has been made.

Lands in the Roswell District in high or moderate potential oil and gas areas that are proposed to be closed to oil and gas leasing under any alternative represent less than five percent of the federal oil and gas mineral estate in the Roswell District. The availability of oil and gas should not be significantly affected. Lands subject to closure could also be subject to drainage from wells outside the closed lands, and the federal government could lose royalties. The long-term effects of oil and gas closures would include lost production opportunities, lost royalties and lost job opportunities, although the impacts are minimal, given the small acreage proposed to be closed.

Of the 360,352 acres in the RRA currently designated closed to oil and gas leasing, 233,551 acres are in areas with high or moderate hydrocarbon potential, which is about two percent of the federal mineral estate in the resource area. All of the 89,457 acres in the CRA currently designated closed to oil and gas are in areas with high or moderate hydrocarbon potential, which is about two percent of the federal mineral estate in the resource area. The actual closure of all the lands in areas of high or moderate hydrocarbon potential that are designated closed to leasing could mean that as many as 35 wells in the RRA and 106 wells in the CRA would not be drilled during the twenty-year planning period. However, because there are existing leases on lands designated closed to leasing, fewer wells actually would be affected. Refer to Table 104 for a summary of the numbers of wells that would be affected by leasing closures.

The effects of Alternative B would be the same as those for Alternative A, except that 402,129 acres in the RRA and 127,539 acres in the CRA would be designated closed to oil and gas leasing. Of the 402,129 acres in the RRA proposed to be closed to oil and gas leasing, 272,136 acres are in areas with high or moderate hydrocarbon potential, which is about three percent of the federal mineral estate in the resource area. All of the acreage in the CRA proposed to be closed to oil and gas leasing is in areas with high or moderate hydrocarbon potential, which is about three percent of the federal mineral estate in the resource area. The actual closure of all the lands in areas of high or moderate hydrocarbon potential that are designated closed to leasing could mean that as many as 41 wells in the RRA and 151 wells in the CRA would not be drilled during the twenty-year planning period. Again, because there are existing leases on lands designated closed to leasing, fewer wells actually would be affected.

Under Alternative B, the increase of 79,859 acres district-wide in no-leasing acreage over current management (Alternative A) could represent a loss of bonus bids of up to $3,673,514, based on a rate of $46 per acre, which is the average per-acre bid for all New Mexico tracts at three 1993 lease sales. This is equivalent to about three percent of bonus bids expected for the planning period, based on an

TABLE 104
ESTIMATED NUMBERS OF WELLS THAT WOULD NOT BE DRILLED DUE TO LEASING CLOSURES, BY ALTERNATIVE

	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E
Roswell Resource Area	35	41	37	39	41
Carlsbad Resource Area	106	151	103	125	127
Total	141	192	140	164	168

Source: BLM files, 1994.

estimated $1,600,000 in bonus bids per sale for four sales a year.

The effects of Alternative C would be the same as those for Alternative A, except that 367,094 acres in the RRA and 87,012 acres in the CRA would be designated closed to oil and gas leasing. Of the 367,094 acres in the RRA proposed to be closed to oil and gas leasing, 240,301 acres are in areas with high or moderate hydrocarbon potential, which is about two percent of the federal mineral estate in the resource area. All of the acreage in the CRA proposed to be closed to oil and gas leasing is in areas with high or moderate hydrocarbon potential, which is about two percent of the federal mineral estate in the resource area. The actual closure of all the lands in areas of high or moderate hydrocarbon potential that are designated closed to leasing could mean that as many as 37 wells in the RRA and 103 wells in the CRA would not be drilled during the twenty-year planning period. As with the other alternatives, because there are existing leases on lands designated closed to leasing, fewer wells actually would be affected.

Under Alternative C, the increase of 4,297 acres district-wide in no-leasing acreage over current management (Alternative A) could represent a loss of bonus bids of up to $197,662, based on a rate of $46 per acre, which is the average per-acre bid for all New Mexico tracts at three 1993 lease sales. This is equivalent to less than one percent of bonus bids expected for the planning period, based on an estimated $1,600,000 in bonus bids per sale for four sales a year.

The effects of Alternative D would be the same as those for Alternative A, except that 379,438 acres in the RRA and 105,557 acres in the CRA would be designated closed to oil and gas leasing. Of the 379,438 acres in the RRA proposed to be closed to oil and gas leasing, 258,445 acres are in areas with high or moderate hydrocarbon potential, which is about three percent of the federal mineral estate in the resource area. All of the acreage in the CRA proposed to be closed to oil and gas leasing is in areas with high or moderate hydrocarbon potential, which is about three percent of the federal mineral estate in the resource area. The actual closure of all the lands in areas of high or moderate hydrocarbon potential that are designated closed to leasing could mean that as many as 39 wells in the RRA and 125 wells in the CRA would not be drilled during the twenty-year planning period. Again, because there are existing leases on lands designated closed to leasing, fewer wells actually would be affected.

Under Alternative D, the increase of 35,206 acres district-wide in no-leasing acreage over current management (Alternative A) could represent a loss of bonus bids of up to $1,619,476, based on a rate of $46 per acre, which is the average per-acre bid for all New Mexico tracts at three 1993 lease sales. This is equivalent to about one percent of bonus bids expected for the planning period, based on an estimated $1,600,000 in bonus bids per sale for four sales a year.

The effects of Alternative E would be the same as those for Alternative A, except that 396,669 acres in the RRA and 107,097 acres in the CRA would be designated closed to oil and gas leasing. Of the

396,669 acres in the RRA proposed to be closed to oil and gas leasing, 269,236 acres are in areas with high or moderate hydrocarbon potential, which is about three percent of the federal mineral estate in the resource area. All of the acreage in the CRA proposed to be closed to oil and gas leasing is in areas with high or moderate hydrocarbon potential, which is about three percent of the federal mineral estate in the resource area. The actual closure of all the lands in areas of high or moderate hydrocarbon potential that are designated closed to leasing could mean that as many as 41 wells in the RRA and 127 wells in the CRA would not be drilled during the twenty-year planning period. As with the other alternatives, because there are existing leases on lands designated closed to leasing, fewer wells actually would be affected.

Under Alternative E, the increase of 53,957 acres district-wide in no-leasing acreage over current management (Alternative A) could represent a loss of bonus bids of up to $2,482,022, based on a rate of $46 per acre, which is the average per-acre bid for all New Mexico tracts at three 1993 lease sales. This is equivalent to about two percent of bonus bids expected for the planning period, based on an estimated $1,600,000 in bonus bids per sale for four sales a year.

EFFECTS OF THE SURFACE USE AND OCCUPANCY REQUIREMENTS

In general, the effects of the Surface Use and Occupancy Requirements on oil and gas development under Alternatives B, C, D, and E, would be the same as those described above for timing, controlled surface use, and no surface occupancy stipulations. See Appendix 3 for a description of the proposed management and affected acreage under those alternatives.

The effects of implementing the prairie chicken timing and controlled surface use restrictions under Alternatives B, C, D, and E would be similar to the effects of the timing limitations under current management. A primary difference from Alternative A, however, is that set-backs from prairie chicken leks would slightly increase the amount of area that could not be occupied for development. These impacts would be the same as those for the no surface occupancy stipulation.

Under the use and occupancy requirements, new surface disturbance may be prohibited within up to 200 meters or 400 meters of certain features, to protect natural resource values. Moving surface disturbing activities by up to 200 meters from a particular feature has been, and is currently, the practice. The effect of the requirements would range from no additional impact over current management, to some additional amount of the same kinds of impacts described for lands having the no surface occupancy stipulation.

IMPACTS FROM USING PRACTICES FOR DRILLING IN CAVE AND KARST AREAS

The potential impacts of using the Practices for Drilling in Cave and Karst Areas (Appendix 5) are discussed below in terms of discrete requirements or actions that may be required for wells drilled in cave or karst areas. The Interim Cave and Karst Drilling Guide is the basis for alternative management options for drilling in cave or karst areas.

Detection Methods

Under Alternatives A, C, D, and the Preferred Alternative, impacts associated with implementing detection methods could range from no impact, to a delay in approving the drilling location or having to reschedule drilling plans. Depending on the results of the initial field exam, Alternative B could result in increased costs of up to $75,000 to operators, depending on the method of detection used, because of the need to conduct more specialized detection.

Surface Mitigation

Surface mitigation measures for cave or karst protection would be required in the event that the detection methods indicate the presence of cave or karst features.

Under all alternatives, if a feature is detected, impacts could result in one of a range of impacts. A delay in approving the drilling location could occur. The relocation of the drilling location, with the possibility of directional drilling, could result in higher drilling costs. The rejection of the drilling location could result in lost production and revenues if a suitable well location could not be found. The federal government could lose royalties and the public could lose a potential energy resource. It is currently common practice to relocate potential drilling sites up to 200 meters to minimize potential impacts to cave or karst, with no significant adverse effects to operators.

Under all Alternatives, impacts associated with implementing practices to minimize potential impacts from reserve pit spills or leakage could range from no additional impact (as these practices have long been employed to mitigate impacts), to increased operational costs of up to $40,000 per well, depending on the type of practice used. The use of a modified "V" pit as described in Appendix 5, has shown to produce a savings of up to $11,000.

Under all Alternatives, impacts associated with implementing practices on a per well basis to minimize potential impacts from leaking tanks or pipelines could result in additional costs of up to 10 percent for the installation of leak detection systems for pipelines or tanks. An increase of 50 percent in additional costs for the use of permanent liners in storage tank areas may occur. Up to 10 percent additional cost for the use of differential pressure shut-off valves and corrosion-inhibiting coatings and cathodic protection could occur if these practices are employed.

Under all Alternatives, impacts associated with implementing practices to minimize the potential impacts of vented or escaping gases settling in caves would result in no new impacts, since practices would remain the same as currently required.

Subsurface Mitigation

Under all Alternatives, impacts associated with implementing drilling practices that would minimize potential impacts to caves or karst would result in increased costs due to the type of drilling operation required (i.e., drilling with cable tool or rotary rigs and using fresh water mud or air as a circulating medium). However, most operators are currently using these drilling practices in the identified cave or karst areas, so impacts only would be to operators currently not using these techniques in high porosity/permeability zones. Using these techniques versus using conventional techniques could result in increased operational costs of up to $25,000 per well.

Under Alternatives A and C, impacts associated with implementing casing and cementing practices that would minimize potential impacts to caves or karst would result in no additional impact, since practices would remain the same as for conventional drilling. Under Alternatives B, D, and E, increased costs of up to $70,000 per well could result due to special casing requirements. If a bit drop of four or more feet and 75 percent circulation loss is encountered simultaneously, drilling would immediately stop and the BLM would be notified. If this occurred, costs of up to $6000 per day could result from the rig being on standby. In an extreme case, if the problem could not be resolved, the well would be plugged, which may result in lost production and revenue, the federal government could lose royalties, and the public could lose a potential energy resource. However, based on past history, a well has never been required to be plugged due to bit drop and lost circulation problems, and the likelihood of the BLM requiring a well to be plugged is small.

Under Alternatives B and E, impacts associated with monitoring drilling operations in areas where caves or karst are known or expected would have a minimal impact. Increased paperwork documenting and evaluating drilling progress could result. Under Alternatives A, C, and D, there would be no impact, because monitoring would not be required.

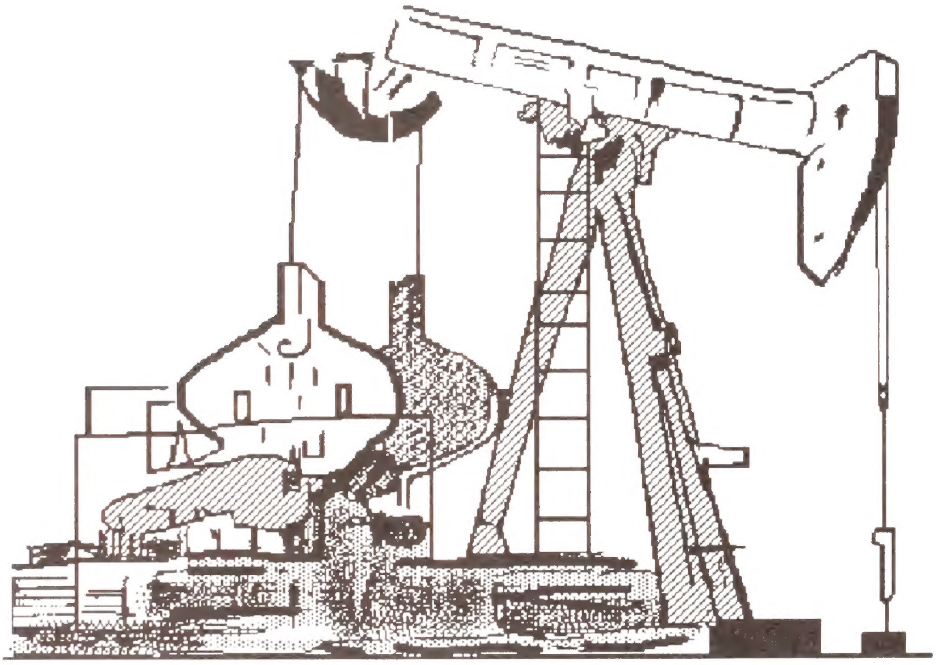
Under Alternatives B and E, annual bradenhead tests could result in increased costs of up to $200 a year, per well. If test results indicate casing failure, remediation would be required and costs would increase. Under Alternatives A, C, and D, there would be no impact, because monitoring would not be required.

Under Alternatives B and E, more stringent record keeping in areas where caves or karst are known or expected, would have minimal additional impact, other than the possibility of increased paperwork from the documentation and evaluation of drilling operations. However, this type of documentation is currently practiced and provided, in part, as Sundry Notices. There would be no additional impact from record keeping under Alternatives A, C, and D.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Impacts from ACEC designation on oil and gas leasing and development would not differ from the impacts described above. In the case of Fort Stanton, the area already is closed to leasing; no additional impacts would result. With regard to the Overflow Wetlands, North Pecos River, Roswell Caves Complex and Mescalero Sands proposed ACECs, the use of controlled surface use (CSU) or no surface occupancy (NSO) stipulations, and closures to leasing, would affect minute acreages.

In some cases, oil and gas leases already exist in the proposed ACECs, and potential development would continue under the terms of the lease and appropriate conditions of approval. The impacts of these requirements would be minimal and essentially the same under all alternatives. The use of CSU or NSO stipulations, and closures to leasing, on presently unleased areas would create greater impacts (similar to those described above) than under current management, because preexisting rights of development do not exist. However, the amount of unleased mineral estate is very small in the Roswell Resource Area and the magnitude of impacts would be very small.



LOCATABLE MINERALS

IMPACTS OF ALTERNATIVES

Under all alternatives, acreage withdrawn from locatable mineral entry would reduce opportunities to explore and develop mineral resources. While the potential is high for occurrence of locatable minerals in the areas currently withdrawn and those proposed for withdrawal, the long-term effect is minimal because of the relatively small amount of acreage that would be withdrawn.

Requirements for plans of operation, reclamation bonds, and environmental assessments for mining proposals (other than casual use) in areas closed to off-highway vehicle use, ACECs or lands under wilderness review, while protecting natural resources, also increase the cost of exploration and development for mining proponents, and could produce mining delays. Costs of mitigation in areas covered by plans of operation would also increase the cost of doing business in both the short term and long term. In the extreme, projects could be precluded because of their potential effects. However, because of the low level of mining activity anticipated, these impacts would be insignificant.

Because of the relatively small amount of acreage proposed for withdrawal compared to the large area of high mineral potential available for development, there are no proposed management actions that would significantly affect the availability of locatable minerals.

Mining obviously produces an irreversible and irretrievable commitment of resources. The magnitude of that commitment would vary with the amount of mining activity (exploration and extraction) performed yearly on mining claims, but activity is expected to be at low levels. A positive economic benefit could result from the mining activities.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Under Alternative A, for all ACECs except Fort Stanton, the impacts of mining are the same as those described for lands open to mineral entry under the mining laws. Because Fort Stanton is withdrawn from mineral entry, under Alternative A, there would be no impacts there from mining. Under Alternatives B, C, D, and E for all the ACECs, withdrawals from mineral entry would preclude impacts from mining. The impacts to the mining industry from mineral withdrawals in the ACECs would be the same as those described previously for other mineral withdrawals.

SOLID LEASABLE MINERALS

IMPACTS OF ALTERNATIVES

Opportunities for exploration and leasing would be lost on about 281 acres already closed to the leasing of solid minerals. However, the impacts are expected to be minimal due to the small area affected and the low potential for development.

Under all alternatives, the individual areas proposed for closure to solid mineral leasing are relatively small. Together they represent less than one percent of the federal mineral estate in the Roswell Resource Area.

Under Alternatives B, C, D and E, the Surface Use and Occupancy Requirements, especially no surface occupancy restrictions, would affect solid leasable mineral development by limiting use. In many cases, mitigation measures imposed to reduce impacts of exploration and development may increase the cost of doing business by delaying projects, forcing alternative areas for development, restricting activities, and increasing reclamation costs. In rare cases, some activities may be precluded.

Minerals removed and sold would result in an irreversible and irretrievable loss of the mineral resource, although that commitment is expected to be small due to the limited demand for solid leasable minerals. The Surface Use and Occupancy Requirements could increase costs of doing business in the short term and, in some cases, the long term.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Under Alternative A, the impacts of mining solid leasable minerals in ACECs would be the same as those associated with mining on other lands open to the mining of solid leasable minerals. Under the other alternatives, the impacts to the industry interested in mining solid leasable minerals resulting from the closure of lands would be the same as those identified previously for other lands closed to leasing.

SALABLE MINERALS (MINERAL MATERIALS)

IMPACTS OF ALTERNATIVES

Under all alternatives, no surface occupancy restrictions, seasonal restrictions, and the Surface Use and Occupancy Requirements would adversely affect the mining of mineral materials district-wide. Restrictions on removing mineral materials may increase the costs of doing business by delaying projects, by forcing an alternative source for mineral materials, by increasing hauling distances and hauling costs, by limiting flexibility in the timing of activities, by increasing reclamation costs, and by precluding some activities.

Under all alternatives, the acreage proposed for closure to the disposal of saleable minerals comprises a relatively small portion of the resource area and should not significantly affect the availability of mineral materials. Additional costs associated with increased haul distances in areas where material is not readily available would have a negative long-term impact on the entities that are dependent on mineral materials. Materials are generally readily available throughout the resource area including lands adjacent to those proposed for closure.

A negative effect of pit closures under any alternative may be increased costs associated with longer haul distances in areas where material is not readily available. In general, however, the effects of closing depleted or unnecessary pits are expected to be small, since mineral materials are generally readily available from other nearby sites.

An irreversible and irretrievable commitment of resources obviously occurs when mining is conducted and the minerals are sold. However, economic benefits are realized from the sale and future use of the materials.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

Under Alternatives B, C, D, and E, impacts associated with closing the lands in ACECs (except Fort Stanton) to mineral material disposal would be minimal and are the same as described previously. Under Alternative A, the effects of continuing the existing closure to the disposal of mineral materials at Fort Stanton are the same as those previously identified. The impacts under Alternative B would be the same as under Alternative A, except that a five-acre tract for a community pit and a 1,666-acre tract within the Sierra Blanca Airport boundary would be available to meet local needs. Alternatives C, D and E would provide the greatest opportunity for meeting public needs for mineral materials at Fort Stanton.

IMPACTS OF MANAGEMENT COMMON TO ALL ALTERNATIVES

The presence of cultural resources in areas proposed for rights-of-way, permits and leases would, under most circumstances, cause delays in construction and increase the length of a right-of-way due to the need to re-route the project to avoid impacts to the cultural resources. This could increase the cost of construction of the project. In areas where the cultural resources could not be avoided and site testing or excavation is required, increases in project cost would result, sometimes making the project cost-prohibitive.

Timing restrictions to protect wildlife in the prairie chicken and raptor areas could cause delays in construction, which could result in increased construction cost.

Excluding rights-of-way, permits and leases from recreation, cave, riparian and wetland areas would cause proponents of new development to reroute projects, causing increases in the distance and construction costs of each project, and in some instances making construction projects cost-prohibitive.

Impacts from applying no surface occupancy restrictions would be the same as those addressed for rights-of-way exclusion areas.

Land tenure adjustments would occur only if the benefits outweigh any adverse impacts, and if there are no significant impacts that cannot be mitigated. The ability to sell or exchange land and to issue Recreation and Public Purposes (R&PP) leases and patents would benefit communities and industry. The sale or exchange of isolated tracts would result in the disposal of lands that are difficult and uneconomical to manage. Negative impacts would be associated with the creation of split ownership if the mineral and surface estate are not kept intact. Positive long-term impacts would be increased efficiency and lower costs in managing the public lands.

Since there are no known water power resources identified in the Roswell Resource Area, water power resources would not be adversely affected.

The majority of realty actions require short-term use of lands, and long-term productivity is restored upon rehabilitation of disturbed areas. Unavoidable adverse economic impacts would result from constraints for resource protection that impact the routes selected, and from timing restrictions on construction activities. The greatest impact would be in those areas which would be managed as no surface occupancy areas and avoidance or exclusion areas for rights-of-way, permits and leases. Short-term impacts on long-term productivity due to exclusion of rights-of-way, permits, and lease development could include increased project costs due to an increase in the length of the right-of-way to avoid restricted right-of-way areas, or no surface occupancy areas in the case of oil and gas leases.

Lands would be lost to the public land base when sold or exchanged. Under a land exchange, however, lands of comparable value would be obtained. The short-term impacts of land adjustment would affect the long-term management of public lands in the planning area.

IMPACTS OF ALTERNATIVES

A more active land tenure program would result under Alternatives B, C, D, and E, than currently exists under Alternative A. Relying primarily on land exchanges could result in a more desirable land ownership pattern than relying primarily on sales. The main benefit of the exchange method is that it tends to balance the impacts of disposal with those of acquisition. Lands would be permanently lost to use by the public when sold or exchanged. Under exchange, however, lands of comparable value would be obtained.

Under Alternatives B, C, D, and E, the acquisition of easements would allow the BLM to improve accessibility to public land, resolve conflicts and provide better opportunity for the management of the public lands. Under all alternatives, acquisitions would benefit recreation, cultural, visual, wildlife and other resource values. Consolidation of public land would significantly improve management efficiency and effectiveness, reduce management cost, and block up key areas to provide improved protection for resources.

The disposal of public lands through sale or land exchange, with retention of the mineral estate in federal ownership, would complicate future management of the federal mineral estate. Split ownership of the mineral and surface estates often creates public confusion regarding the ownership and management of those lands.

The ability to sell or exchange land and to issue R&PP leases and patents would benefit communities and industry. The sale or exchange of isolated tracts would result in the disposal of lands that are difficult and uneconomical to manage, and would benefit private landowners whose lands currently have federal land inholdings. Disposal of suitable tracts within the resource area would be unlikely to cause any significant impact to the public land resource values.

Under all alternatives in Roswell Resource Area, seasonal restrictions and other mitigation measures to protect resource values, such as threatened or endangered species, would impact placement of construction projects. Construction projects may have to be delayed or rerouted to protect cultural or historical values, wildlife habitat, or T & E species. This would cause increased distances for construction projects, delays, longer construction periods, and associated increases in costs. In the Roswell Resource Area under Alternative B, the delay to construction projects from the timing stipulation could be as many as four months; under Alternative C, as many as two months; under Alternative D, as many as three months; and under Alternative E, as many as three months.

Seasonal restrictions for the Carlsbad Resource Area would be the same as those described for the Roswell Resource Area, except that under Alternatives B and E, the setback or buffer from known leks would increase from 200 to 400 meters.

Under Alternative A, right-of-way exclusion areas would require proponents of new developments to reroute projects, causing increases in the distance and construction costs of each project. In the larger exclusion areas such as Little Black Peak, Carrizozo Lava Flow and Mescalero Sands, the impacts of rerouting projects would be much greater than in the smaller exclusion areas, in some instances making the construction projects cost-prohibitive.

Under Alternatives B, C, D and E, the impacts of exclusion areas on rights-of-way projects would be the same as those described under Alternative A, except that only major rights-of-way would be excluded. Major rights-of-way would be excluded on about 335,573 acres in 16 areas under Alternative B, about 55,533 acres in eight areas under Alternative C, about 90,375 acres in 14 areas under Alternative D and about 90,895 acres in 15 areas under Alternative E. Rights-of-way exclusion areas would increase construction costs and have a negative economic impact on rights-of-way proponents.

Avoidance areas for rights-of-way are not established under Alternative A. Under Alternatives B, C, D and E, right-of-way avoidance areas would produce essentially the same impacts as those described for exclusion areas, except that major rights-of-way could be allowed in avoidance areas on a case-by-case basis if no appropriate alternative location exists. Major rights-of-way would be avoided on about 310,833 acres under Alternative B, on about 306,219 acres under Alternative C, on about 246,987 acres under Alternative D and about 249,463 acres under the Preferred Alternative. Right-of-way avoidance areas would result in increased construction cost and have a negative economic impact on the proponent. Right-of-way avoidance areas would be less restrictive than exclusion areas.

For the Roswell and Carlsbad Resource Areas, impacts on rights-of-way development from the Surface Use and Occupancy Requirements and setbacks under Alternatives B, C, D, and E, would be the same as those described for exclusion areas under Alternative A, with delays in construction and increases in distance from realignments. Increased construction costs would result. The 400-meter restriction proposed under Alternative B would have a greater impact on land use authorizations than the 200-meter restriction proposed under Alternatives C, D and E.

The majority of realty actions require short-term uses of lands. Long-term productivity is restored upon rehabilitation. Unavoidable adverse economic impacts would result from constraints applied for resource protection that affect the routes selected and the timing on construction activities. The greatest impact would be on specific areas (e.g. caves or floodplains) affected by the Surface Use and Occupancy Requirements and those areas listed as avoidance or exclusion areas for major rights-of-way. Cumulative impacts would be increased cost to rights-of-way proponents.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

For all the proposed ACECs, there would be no negative impacts to rights-of-way development under Alternative A, because the areas would be open to rights-of-way. Impacts to rights-of-way under the other alternatives would be the same as those described previously for exclusion and avoidance areas. Exclusion areas under Alternatives B, D and E, would have more impact on rights-of-way than avoidance areas proposed under Alternative C. Alternative C would have the least impact on rights-of-way.

Under Alternatives C, D and E, the restriction of no surface disturbing activities within 200 meters of nine caves within the Roswell Cave Complex ACEC would have the same impacts on rights-of-way as those described previously for right-of-way exclusion areas. The 400-meter restriction under Alternative B would have a greater negative impact on rights-of-way.

For all the proposed ACECs, impacts from land acquisition under Alternatives B, D and E, would be the same as those described previously for land tenure adjustments. Land acquisition would improve manageability by consolidating ownership and eliminating potential use conflicts.

LIVESTOCK GRAZING

IMPACTS OF MANAGEMENT COMMON TO ALL ALTERNATIVES

Maintenance of the shortgrass aspect in the grasslands plant community would decrease the amount and density of brush species, which would lead to an increase in forage available to livestock.

Not allowing new netwire fence construction could limit flexibility in making changes in sheep allotments, because current management practices rely heavily on netwire pasture fencing. Replacing existing netwire fences with barbed wire fences could have a severe impact on sheep allotments, because netwire fencing is used to control sheep, goats and predators. Installing antelope passes, lowering fences, and modifying fences for antelope or mule deer, are currently covered by BLM regulations and fence standards. Grazing allottees in compliance with those regulations and standards would not be affected.

IMPACTS OF ALTERNATIVES

OIL AND GAS

During the 20-year life of the plan, surface disturbance from oil and gas operations under each of the alternatives would result in a loss of approximately 1227 AUMs (0.37 percent of current annual permitted grazing) of available forage in the Roswell Resource Area and approximately 7,661 AUMs (3.54 percent of the current annual permitted grazing) in the Carlsbad Resource Area. These numbers are relatively insignificant over the entire Roswell District. However, in heavily developed oil fields some livestock reductions may be needed to balance grazing use with available forage.

Geophysical exploration and the construction of oil or gas well drilling sites and roads may disturb established vegetation study transects that are an integral part of the BLM's rangeland monitoring. This conflict can be mitigated by avoidance when planning exploration projects or oil and gas developments.

LIVESTOCK GRAZING MANAGEMENT

Construction of range improvements, such as pipelines and fences, would cause a small, short-term loss of forage. Vegetation at water trough and reservoir locations would remain disturbed in small (1 to 2 acres per site), localized areas over the long-term. Benefits of project construction would include increasing the ease of managing livestock, reducing stress on livestock and wildlife by improving water source distribution, and encouraging better utilization patterns of available forage. These impacts would be similar for all alternatives. The amount and type of construction would determine the amount of impact.

Under Alternative A, the stocking rate for sheep in the Macho Habitat Management Area (HMA) of 50 head per section in any given pasture would affect about 42 percent of the resource area. The Habitat Management Area contains 634,665 acres of public land and 90 allotments. This alternative would restrict grazing practices on all allotments with sheep. Restricting numbers to specified levels would limit options in developing grazing systems, since rotational grazing involves increasing numbers in some pastures, while resting others. Limiting the number of sheep to 50 head per section would hinder developing rest rotation of sheep herds between pastures, necessitating a reduced number of sheep on an allotment. Limiting sheep numbers under Alternative A, could cause some allottees to reduce the size of sheep herds on some allotments and seek pasture elsewhere. If a change in the class of livestock was necessitated by the sheep limitation, changes in range improvements, such as fences, could follow.

Both Alternatives A and B would affect all sheep allotments in the Macho HMA, regardless of antelope residency or potential for antelope. But, the impact of Alternative B would be somewhat less because the proposed stocking rate is an average of 50 sheep per section per allotment, which is less restrictive than Alternative A. Because it is less restrictive, some management flexibility would be available to allottee. For example, rest rotation grazing programs could be developed.

Of the alternatives, Alternative C would least restrict sheep grazing in the Macho HMA because it allows a sheep stocking rate of 65 sheep per section per allotment over the course of the grazing year. This stocking rate would not create a need to change the class of livestock on the allotment and would allow a rest-rotation system to be effective. Forage type and utilization patterns would still be an effective livestock management tool.

Alternative D would require a stocking rate of sheep of 60 sheep per section per allotment over the course of the grazing year, but would still maintain a flexibility in a rest-rotation system. Alternative E would affect fewer allotments than Alternatives A, B and C. Alternative E would affect only the stocking rate of sheep on allotments in the Macho Habitat Management Area that currently support antelope and which meet the transplant criteria.

VEGETATION MANAGEMENT

Alternative B proposes a 40 percent forage utilization level, which could result in a reduction in livestock numbers by 3,120 animal units or 37,440 animal unit months. Lowering livestock numbers would either alter herd sizes or require allottees to locate additional pastures off public lands. Alternatives A, D and E, propose a 45 percent forage utilization level, which would maintain current livestock stocking levels. Alternative C proposes increasing the utilization levels to 50 percent, which could result in an increase of livestock by 3,120 animal units or 37,440 AUMs (11 percent of current permitted use) across the resource area. However, this increase may be short-term if vegetative condition begins to decline.

Impacts to livestock grazing from vegetative treatments proposed under all alternatives would be similar. However, the magnitude of impacts would vary with the number of acres treated and with the method of treatment. Deferring grazing after a vegetative treatment would affect livestock by decreasing the forage immediately available, but this short-term impact would be offset by increased vegetative vigor, seed production, and forage production.

Vegetative treatments may necessitate a change in some grazing systems or in livestock numbers, in some cases. Treatments may result in temporary adjustments in livestock numbers because livestock have to be relocated to different areas to allow the treated area to rest. In some instances, such as in lesser prairie chicken habitat or dunes sagebrush lizard habitat, livestock numbers may have to be reduced temporarily, but for a long period of time, or be permanently reduced, to ensure the viability of wildlife habitat and to reduce conflicts between livestock grazing and maintenance of habitat. Both long-term temporary and permanent reductions would affect the economics of affected allotments.

Following treatment, vegetation composition would change to a lower percentage of brush and a higher percentage of grasses and forbs. Vegetative treatments by methods other than chemicals would be less effective in some cases and livestock grazing could be adversely affected. For example, salt cedar control would benefit livestock grazing by allowing species such as sacaton to flourish, and improved range condition would result.

OUTDOOR RECREATION MANAGEMENT

Recreation use of the Mescalero Sands North Dune, Haystack Mountain and Dunahoo Hills OHV areas would cause harassment of livestock and damage vegetative resources. Damage and vandalism to range improvements currently occurs in developed OHV areas and is expected to continue. A benefit of designated OHV areas is that the majority of OHV users are confined to specific areas. This would concentrate damage to vegetation into a confined area and reduce the effects over the remainder of the resource area. Damage to vegetation and disturbance of livestock are related to the amount of acreage involved in OHV areas. Impacts to livestock grazing would vary by alternative with the acreage proposed for OHV use. The adverse impacts to livestock from OHV use would be the greatest under Alternative A and least under Alternative B. Impacts under the other alternatives would decrease in the following order: Alternative E, due to the additional acreage proposed for closure to grazing; Alternative D, and Alternative C. Alternative B also proposes that the entire 610 acres in the Mescalero Sands North Dune

OHV area be closed to livestock grazing. This closure would result in the loss of 11 animal units or 132 AUMs.

WATERSHED MANAGEMENT

Many projects, such as erosion control structures, vegetative treatments, or water developments for watershed or wildlife, generally benefit livestock. Watershed projects that reduce soil erosion would increase forage availability in the long term. Water and forage quality may improve for livestock under riparian pasture development.

Season of use changes, such as short-duration livestock grazing, would be a change from typical existing management. New management practices would create a short-term impact on allotment management until changes were fully incorporated into allotments. Excluding livestock or reducing stocking rates also would have an adverse impact on livestock operators if the operators were forced to either reduce the size of their livestock operations or locate pasture elsewhere. These changes may produce a short-term economic hardship. However, additional forage, if available to livestock, would be a long-term benefit.

Under Alternatives B, C, D, and E, watershed management practices such as controlling livestock numbers or changing season of use would affect livestock grazing. These practices may cause allottees to seek alternate pasture, temporarily reduce livestock numbers, or increase stocking in other pastures, resulting in an increased economic burden. When treated areas are closed for reseeding, livestock grazing would be adversely affected by the decreased available forage. When areas are re-opened to livestock use, livestock would benefit from increased available forage, and, possibly, better nutritional value of the forage.

If exclosures proposed under Alternatives B, C, D, and E, for water source protection are constructed, they could limit water sources for livestock. A reduction in the number of watering locations for livestock would alter grazing patterns and could lead to heavier forage utilization around remaining water sources. These impacts could be mitigated by constructing or developing other watering locations. Exclosures could disrupt the layout of pastures in an allotment, may disturb normal livestock movement, which could alter utilization patterns, and make livestock gathering and pasture rotation difficult. Because the number of exclosures constructed is likely to be small, these impacts would not be significant.

On the Pecos River, Salado Creek, and the Rio Bonito, proposed riparian pastures with controlled grazing practices would affect current livestock management practices, but would benefit riparian areas. Short-duration livestock grazing and limited numbers associated with the riparian pastures would be a change from the majority of existing management. This management would cause short-term impacts to allottees until rotational schemes were fully incorporated into allotments. Positive benefits to grazing would occur as forage species proliferate in the riparian pastures.

FIRE MANAGEMENT

Negative impacts of fire on livestock grazing would be short term under all alternatives. They are the loss of currently available forage for livestock and wildlife, and possible damage to range improvement projects, which would create expense and reduce flexibility for operators. A short-term loss of vegetative cover and forage availability would be expected with all fires. However, the length of time until sufficient forage is available for grazing varies with the treatment. Deferment from grazing ranges from one month after a sacaton burn to two or more growing seasons in upland areas burned for brush species reduction.

Benefits of fire include the increased amount of forage available, increased palatability and nutritional value of the forage, decreased amounts of decadent or standing dead vegetation, decreased amounts of encroaching brush or concentrated brush unusable for cover, and increased management ease of the livestock animals. A long-term change in the type of vegetation is expected in areas where fire results in the reduction of brush species.

Occasionally, grazing is deferred up to one growing season prior to a prescribed burn to allow fine fuel loads to increase. Impacts from prescribed fire would be similar to those from wildfire for all alternatives. Under Alternative A only an additional 105 acres could be treated by prescribed burning because of limits imposed under current management. This would preclude treatment of other areas which could benefit from the use of fire.

Those areas would either have to be treated by less economical, efficient or effective means, or remain untreated. In some areas, allowing the buildup of decadent vegetation would promote conditions for wildfire to occur, and could result in extensive forage loss.

Impacts from wildfire suppression would vary with the location of the fire. Full suppression of wildfires would benefit livestock grazing in the short term by saving as much forage as possible. The conditional level of fire suppression would potentially cause more forage to be lost over the short-term than full suppression. These impacts would be the same under all alternatives.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

OVERFLOW WETLANDS ACEC

Alternatives B, C, D, and E, call for adjustment of as many as 1,476 AUMs of grazing use on Allotments 65060, 65062, and 65069. Under Alternatives B and E, restricting the season of grazing to the period of March 1 through June 30 in combination with an inability to allow grazing due to goldenrod toxicity from fall to spring would limit actual grazing use from April through June 30. This would result in either a loss of the animal units normally attached to this area; an increase in the stocking rates throughout the remainder of the allotment; or maintenance of the number of animal unit months by intensively grazing the area for the shortened duration. The grazing season as proposed under Alternatives C and D would result in the same types of impacts, with a reduced intensity. Grazing season use adjustment as proposed by Alternative C would have the least amount of impact. Lowering livestock numbers would either decrease the herd size or require allottees to locate additional pasture. These impacts would cause economic hardship. Benefits of limiting use include protecting riparian, aquatic and T & E species habitats, and enhancing plant communities.

NORTH PECOS RIVER ACEC

Grazing on Allotments 64038, 64538, and 64039 would be most affected by possible grazing use adjustments, because they contain the majority of acreage included in the ACEC. Under Alternatives B, D, and E, as many as 720 AUMs could be affected, if adjustments are made. Allotment 65001 contains limited acreage in the ACEC and would be minimally affected.

MESCALERO SANDS ACEC

The proposed Mescalero Sands ACEC, which includes portions of four grazing allotments, would negatively affect livestock grazing because future increases of grazing preference would not be allowed under Alternatives B, C, D, and E. This could reduce the likelihood of future vegetation treatments or range improvements by removing incentives for permittees to support these projects. Excluding grazing would result in a loss of up to 1,225 AUMs annually under Alternative B and 96 AUMs under Alternatives D and E.

Excluding new range improvement projects as proposed in Alternatives B, C, D, and E, could affect livestock distribution patterns identified in management plans and not allow for vegetation manipulation projects, such as brush control or prescribed fire. Rangeland improvement tools would be limited to changes in season of use and manipulation of livestock numbers.

Implementing the grazing rest periods identified under Alternative A could conflict with current grazing schedules. Once a rest and grazing schedule has been developed, the licensed number of animals remains the same on the allotment. If rest periods are in excess of one year, pastures allowed to be grazed must absorb the number of livestock removed from the rested pastures. This practice causes heavier utilization in the pastures where grazing is allowed. If the current policy of allowing 45 percent utilization by livestock is maintained, livestock numbers would have to be lowered.

FORT STANTON ACEC

Fort Stanton has been used as a demonstration area since 1991, to illustrate the compatibility of livestock grazing and other resource management operations associated with riparian system management, recreation opportunities, and wildlife enhancement. Current use is 5,316 AUMs. Under Alternative B, livestock grazing would cease.

August through April grazing seasons proposed in Alternative A result in an annual growing season rest, reduce conflicts between recreation use and livestock during the summer months, and allow time for construction or major repair of livestock management facilities, without impacting livestock grazing. Alternative C would not limit grazing to August through April, which would allow more flexibility in grazing. However, growing season rests may not occur as often.

Under Alternatives C and D, the limiting or excluding grazing in riparian areas, highly erodible areas, cave entrances, campgrounds, day use areas, archeological sites, and trails would preclude grazing on up to 1,552 acres, including the 1,480 acres proposed for acquisition.

Fencing to develop riparian pastures, although creating a short-term adverse impact to livestock grazing, would create more diverse management patterns of use.

Under Alternatives C, D, and E, designation of Ft. Stanton as a special recreation management area may attract more recreation users. Individually, the recreation facilities proposed do not represent significant impacts to livestock grazing. Collectively, proposed and existing recreation sites would affect livestock grazing. The addition of camping areas, trails for mountain bikes, OHV use, horses and hiking would attract more people and represent greater potential for conflicts between livestock grazing and recreation users in terms of vandalized range improvements or harassment of livestock.

ROSWELL CAVE COMPLEX ACEC

The impacts to livestock grazing from designation of this ACEC are the same as those addressed in the general discussion of impacts to livestock.

The Roswell Cave Complex ACEC includes portions of 12 grazing allotments, which would be affected by proposed ACEC management. The most significant effect would be the construction of exclosures around cave entrances. The largest single exclosure would be approximately 40 acres, while most exclosures would not exceed one acre in size. An estimated 18 AUs (216 AUMs) could be affected by designation of the ACEC. This is approximately one tenth of one percent of the AUMs in the resource area.

Livestock grazing is an important use of the public lands in the Roswell District.

Those areas would either have to be treated by less economical, efficient or effective means, or remain untreated. In some areas, allowing the buildup of decadent vegetation would promote conditions for wildfire to occur, and could result in extensive forage loss.

Impacts from wildfire suppression would vary with the location of the fire. Full suppression of wildfires would benefit livestock grazing in the short term by saving as much forage as possible. The conditional level of fire suppression would potentially cause more forage to be lost over the short-term than full suppression. These impacts would be the same under all alternatives.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

OVERFLOW WETLANDS ACEC

Alternatives B, C, D, and E, call for adjustment of as many as 1,476 AUMs of grazing use on Allotments 65060, 65062, and 65069. Under Alternatives B and E, restricting the season of grazing to the period of March 1 through June 30 in combination with an inability to allow grazing due to goldenrod toxicity from fall to spring would limit actual grazing use from April through June 30. This would result in either a loss of the animal units normally attached to this area; an increase in the stocking rates throughout the remainder of the allotment; or maintenance of the number of animal unit months by intensively grazing the area for the shortened duration. The grazing season as proposed under Alternatives C and D would result in the same types of impacts, with a reduced intensity. Grazing season use adjustment as proposed by Alternative C would have the least amount of impact. Lowering livestock numbers would either decrease the herd size or require allottees to locate additional pasture. These impacts would cause economic hardship. Benefits of limiting use include protecting riparian, aquatic and T & E species habitats, and enhancing plant communities.

NORTH PECOS RIVER ACEC

Grazing on Allotments 64038, 64538, and 64039 would be most affected by possible grazing use adjustments, because they contain the majority of acreage included in the ACEC. Under Alternatives B, D, and E, as many as 720 AUMs could be affected, if adjustments are made. Allotment 65001 contains limited acreage in the ACEC and would be minimally affected.

MESCALERO SANDS ACEC

The proposed Mescalero Sands ACEC, which includes portions of four grazing allotments, would negatively affect livestock grazing because future increases of grazing preference would not be allowed under Alternatives B, C, D, and E. This could reduce the likelihood of future vegetation treatments or range improvements by removing incentives for permittees to support these projects. Excluding grazing would result in a loss of up to 1,225 AUMs annually under Alternative B and 96 AUMs under Alternatives D and E.

Excluding new range improvement projects as proposed in Alternatives B, C, D, and E, could affect livestock distribution patterns identified in management plans and not allow for vegetation manipulation projects, such as brush control or prescribed fire. Rangeland improvement tools would be limited to changes in season of use and manipulation of livestock numbers.

Implementing the grazing rest periods identified under Alternative A could conflict with current grazing schedules. Once a rest and grazing schedule has been developed, the licensed number of animals remains the same on the allotment. If rest periods are in excess of one year, pastures allowed to be grazed must absorb the number of livestock removed from the rested pastures. This practice causes heavier utilization in the pastures where grazing is allowed. If the current policy of allowing 45 percent utilization by livestock is maintained, livestock numbers would have to be lowered.

FORT STANTON ACEC

Fort Stanton has been used as a demonstration area since 1991, to illustrate the compatibility of livestock grazing and other resource management operations associated with riparian system management, recreation opportunities, and wildlife enhancement. Current use is 5,316 AUMs. Under Alternative B, livestock grazing would cease.

August through April grazing seasons proposed in Alternative A result in an annual growing season rest, reduce conflicts between recreation use and livestock during the summer months, and allow time for construction or major repair of livestock management facilities, without impacting livestock grazing. Alternative C would not limit grazing to August through April, which would allow more flexibility in grazing. However, growing season rests may not occur as often.

Under Alternatives C and D, the limiting or excluding grazing in riparian areas, highly erodible areas, cave entrances, campgrounds, day use areas, archeological sites, and trails would preclude grazing on up to 1,552 acres, including the 1,480 acres proposed for acquisition.

Fencing to develop riparian pastures, although creating a short-term adverse impact to livestock grazing, would create more diverse management patterns of use.

Under Alternatives C, D, and E, designation of Ft. Stanton as a special recreation management area may attract more recreation users. Individually, the recreation facilities proposed do not represent significant impacts to livestock grazing. Collectively, proposed and existing recreation sites would affect livestock grazing. The addition of camping areas, trails for mountain bikes, OHV use, horses and hiking would attract more people and represent greater potential for conflicts between livestock grazing and recreation users in terms of vandalized range improvements or harassment of livestock.

ROSWELL CAVE COMPLEX ACEC

The impacts to livestock grazing from designation of this ACEC are the same as those addressed in the general discussion of impacts to livestock.

The Roswell Cave Complex ACEC includes portions of 12 grazing allotments, which would be affected by proposed ACEC management. The most significant effect would be the construction of exclosures around cave entrances. The largest single exclosure would be approximately 40 acres, while most exclosures would not exceed one acre in size. An estimated 18 AUs (216 AUMs) could be affected by designation of the ACEC. This is approximately one tenth of one percent of the AUMs in the resource area.

Livestock grazing is an important use of the public lands in the Roswell District.

IMPACTS OF MANAGEMENT COMMON TO ALL ALTERNATIVES

Areas in which vegetation is totally removed, such as mineral material pits, well sites for oil and gas activities, or access roads, would result in intense localized impacts to vegetation during active use. The magnitude of impacts to vegetation would be directly proportionate to the number of access roads and well sites constructed, the amount of acreage affected, and the length of time the area is disturbed. Typically, the vegetation would be totally removed from the site during initial construction activities, and "invader" species such as broom snakeweed and three-awn grasses, could become sparsely established during site use. Once mineral development ceases and the site is no longer being used, disturbed areas would be recontoured, ripped and reseeded. Vegetation and ground cover would be re-established at the site but would not be of the same makeup as the surrounding area.

Construction of improvements, such as pipelines and fences would cause a disturbance to vegetation along the route by direct removal and crushing. Major rights-of-way would result in the greatest amount of vegetation and soil disturbance. Generally, vegetation would re-establish along these routes within two to three years depending on soil type, degree of disturbance and precipitation. The time needed for revegetation could be reduced by reseeding with the optimum seed mix for that particular range site and by limiting repeated vehicular travel along the route.

Vegetation and soils at livestock water troughs and reservoirs would remain highly disturbed over the long-term. Approximately one to two acres of vegetation would be sacrificed around each new water facility by trampling. Livestock trailing to the water facility would also result in some loss of vegetation.

IMPACTS OF ALTERNATIVES

LIVESTOCK MANAGEMENT

Excluding livestock or reducing stocking rates would benefit vegetation. Eliminating livestock grazing pressure would allow highly preferred forage to regain vigor and would result in an increase of vegetative diversity in the long term. An overall increase in the density of vegetation would occur followed by a subsequent increase in vegetational litter. Increased litter would benefit vegetation by protecting the soil surface, slowing runoff, holding moisture in the soil for a longer period, and adding to the fertility of the soil. In the long term, a slight decrease in vegetative production could occur as litter builds up and grasses, such as sacaton, tobosa and bluestem, become decadent. Properly managed grazing would generally be beneficial because it stimulates plant growth in healthy vegetative communities.

Sheep stocking rate restrictions in the Macho Wildlife Habitat Area under Alternatives A, B, and E, coupled with adequate precipitation when required for plant growth, would increase forb production and diversity. Under Alternatives C and D, forb production would remain essentially unchanged as the production and availability of forbs would remain static due to current sheep stocking rates and season of use.

Deferring grazing after herbicide treatment under Alternatives A, C, D, and E will permit desired vegetation to more successfully respond to the treatment.

VEGETATION MANAGEMENT

Under Alternative A, chemical treatment with approved herbicides would be restricted for use only on creosote, mesquite, snakeweed and catclaw.

Exclusion or extreme limitation of herbicide use, as proposed in Alternatives B and D, would result in vegetative communities supporting high percentages of species having limited livestock and wildlife values. Under Alternatives A, C and E, aerial application of herbicides would result in larger tracts of vegetation being treated at a time. Impacts of chemical vegetative treatment proposed in these three alternatives would vary in magnitude according to the amount of acreage treated.

Alternative D would restrict the amount of acreage of vegetation that could be treated, by limiting application of chemicals to ground application techniques and restricting the treatment to salt cedar. The cost of ground application of herbicides on salt cedar would severely limit project size, resulting in smaller areas of native species restoration. Because of the expense and effectiveness of the treatments allowed, Alternative D would also result in high densities creosote, mesquite, broom snakeweed, acacia, javelina bush, cholla, prickly pear, thistle, goldenrod and shinnery remaining in their respective vegetative community types.

A wider range of vegetative manipulation methods would be available for meeting the desired plant community under Alternatives A, C and E. Cumulatively, the selection of one of these alternatives could facilitate the acceleration of the vegetative trend toward the goals of the desired plant community. Alternatives B and D would still permit some progress towards meeting the goals of the DPC, but the narrower range of methods would result in a slower trend. Within treatment areas, vegetation composition would change to a lower percentage of undesirable brush and a higher percentage of grasses, forbs and desirable woody species.

Salt cedar stands are generally monotypic. Treatment, either by burning or herbicide application, would aid in increasing the biodiversity of the riparian areas invaded by salt cedar. Salt cedar control would allow native species, such as sacaton, willows or cottonwood, to become re-established. Salt cedar control would result in the long-term improvement of vegetative and watershed conditions.

Planting with native species considered highly desirable, in terms of ecological range site goals or desired plant community, could be instrumental in achieving those goals. Planting of preferred species would accelerate the rehabilitation of areas in poor condition and could limit the amount of invasive, undesirable vegetation, resulting in higher quality vegetation and reducing the amount of time the soils are susceptible to erosion.

The BLM's programmatic environmental impact statement entitled *The Environmental Impact Statement for Vegetation Treatment on BLM Lands in Thirteen Western States* provides detail on the impacts of different types of vegetation treatments (chemical, biological, fire, and mechanical) as well as implementation methods for those treatments.

OUTDOOR RECREATION MANAGEMENT

Under all alternatives, adverse impacts to vegetation at recreation sites, such as trampling or unauthorized removal, could occur when recreationists fail to remain on established trails, or leave designated use areas. The magnitude of impacts would depend on the size and number of recreation sites, the intensity of public use, and the sensitivity of the associated vegetative community, but should not be substantial.

Damages to vegetation from OHV use are related to the amount of acreage involved and intensity of OHV use areas. The use of OHVs causes direct physical damage to vegetation by crushing and breaking. Indirect damage to vegetation results from increased soil erosion and soil compaction by limiting the plant's ability to retain a strong root system in the soils. These impacts would be widespread and more intense in those areas designated as open. Alternative A, with 1,415,746 acres open, would have the greatest adverse impacts to vegetation. Impacts to vegetation would be least under Alternative B. A major benefit of restricting OHV use to designated "open" areas is that OHV damage to vegetation is confined to site-specific areas, and the effects over the remainder of the Resource Area are reduced. Alternative C expands OHV areas by about 5,840 acres, potentially resulting in a greater area of vegetative and soils disturbance. Impacts under Alternative D would be less than under either Alternatives C or E, but greater than Alternative B.

WATERSHED MANAGEMENT

Under all alternatives, watershed projects that reduce soil erosion would increase vegetative production and ground cover over the long term. Water and vegetative quality would improve under riparian pasture development.

FIRE MANAGEMENT

The use of prescribed fire under all alternatives would cause a short-term loss of vegetative cover and availability. A long-term change in the type of vegetation is expected in areas where prescribed fire is used for the reduction of brush species. Benefits would include: increased nutrient cycling; an increase in the amount of vegetation; increased quality, vigor, palatability and nutritional value of the vegetation; decreased amounts of decadent or standing dead vegetation; and decreased amounts of encroaching brush or concentrated brush unusable for cover.

Under all alternatives, impacts from wildfire suppression would vary with the location of the fire. Full suppression of wildfire in designated areas would protect important or unique plant communities such as riparian areas. The activities from conditional suppression would also protect special status plant species and habitat. Full or conditional fire suppression could limit the beneficial aspects of fire by "protecting" vegetation with lower quality and palatability, or allow for an increase in woody species in relation to grass species. The conditional level of fire suppression would potentially cause more vegetation to be lost over the short-term than full suppression.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

OVERFLOW WETLANDS ACEC

Impacts to vegetation from recreation use, exclusion or restriction of livestock grazing, and vegetation treatments are the same as those discussed previously.

Impacts to vegetation from OHV use in this ACEC would be the same as those discussed above. Alternative E would reduce impacts from OHVs and benefit vegetation the most by closing 1,040 acres to OHV use and limiting use on 2,100 acres to designated roads and trails. Alternatives B and D would provide more benefit to vegetation by controlling OHV use than would Alternative C. The use of OHVs under Alternative A would have the greatest negative impact on vegetation because the ACEC would remain open to OHV use.

The acquisition of additional wetland/riparian areas proposed under Alternatives B, C, D, and E would expand and protect the current area of wetland vegetation.

The exclusion or limitation of mineral development, major rights-of-ways and oil and gas activity would have a positive impact on vegetation by reducing surface disturbance. Riparian-wetland vegetation would be protected and maintained.

Excluding the use of chemical retardant and heavy equipment during wildfire suppression may result in a higher loss of vegetation from fire than if those suppression techniques were used. However, not using those techniques would protect water, soils and visual resources.

NORTH PECOS RIVER ACEC

Refer to the general discussion of impacts to vegetation for impacts from reduction in livestock numbers, and from salt cedar control.

Impacts to vegetation from OHV use in this area would be the same as those identified previously. The use of OHVs under Alternative A would have the greatest impact on vegetation because the area would continue to be open to OHV use. Alternative B would benefit vegetation the most by closing 3,360 acres to OHV use. Alternatives C, D and E would provide more benefit to vegetation than Alternative A by limiting OHV use to designated roads and trails.

The exclusion of mineral development, including oil and gas leasing, and avoidance or exclusion of major rights-of-way would benefit vegetation as discussed previously.

MESCALERO SANDS ACEC

Impacts to vegetation from OHV use in this area would be the same as those identified previously. The use of OHVs under Alternative A would have the greatest impact on vegetation as the area would continue to be open to OHV use. Alternative B would benefit vegetation the most by closing 7,888 acres to OHV use. Alternative E would provide the next highest benefit to vegetation by closing 2,478 acres to OHV use and limiting use on the remainder of the ACEC to designated roads and trails.

The impacts to vegetation from other proposed activities are the same as identified previously for those activities.

FORT STANTON ACEC

The exclusion or limitation of mineral development, major rights-of-way and oil and gas activity would benefit vegetation by reducing or eliminating surface disturbance.

Maintenance of range improvements, such as watering facilities and fences, would benefit vegetation by enhancing the management of livestock and maintaining level forage utilization patterns.

Impacts to vegetation from OHV use in this ACEC would be the same as those identified previously. The use of OHVs under Alternative A would have the greatest impact on vegetation resources because the open OHV designation on 14,800 acres would be retained. Alternatives B, C, D, and E would have similar benefits to vegetation by limiting OHV use.

Under Alternative A, the nine-month livestock grazing period (August through April) would provide an annual growing season rest on all pastures open to grazing resulting in long-term health of vegetative communities. Riparian vegetation would be protected by very short periods of grazing use during the dormant season. Under Alternative B, exclusion of livestock or reduction of stocking rates would benefit vegetation by eliminating livestock grazing pressure and allowing plants to regain vigor and would increase the amount and diversity of vegetation. Under Alternative C, all pastures could be open to a grazing period of nine months or more, and could have long-term negative impacts to vegetation, if proper stocking rates and season of use are not implemented. The most sensitive vegetative communities affected by this alternative would be riparian areas and Kuenzler cactus habitat.

Under Alternatives D and E, the proposed exclusion or limitation of grazing in riparian areas, highly erodible areas, cave entrances, campgrounds, day use areas, archeological sites, and trails would benefit vegetation on about 1,550 acres by removing grazing use. Limits on grazing use in these areas could alter utilization patterns and increase grazing pressure on the vegetation adjacent to these areas.

Further discussion of vegetative treatments, maintenance of range improvements, prescribed burns and firewood sales, OHV impacts, mineral development, and possible exclusion or limitation of grazing in certain areas is in the general discussion of impacts to vegetation.

ROSWELL CAVE COMPLEX ACEC

The impacts to vegetation occurring under Alternative A are the same as those addressed in the general discussion of impacts to vegetation.

Impacts to vegetation from OHV use in this area would be the same as those identified previously. The use of OHVs under Alternative A would have the greatest impact on vegetation because the area would remain open to OHV use. Alternatives B, C, D, and E would have similar benefits to vegetation with up to 500 acres closed to OHVs, and the remainder of the area limited to designated roads and trails for OHV use.

The impacts to vegetation from other proposed activities are the same as identified previously for those activities.

Direct impacts to cultural resources result from surface disturbing activities. Projects such as BLM-initiated fences, water pipelines and wildlife waters, and privately sponsored projects such as mining, oil and gas development, and construction in rights-of-way are common causes of surface disturbance. Under all alternatives, cultural resources would be affected by these kinds of projects.

IMPACTS OF ALTERNATIVES

OIL AND GAS

Currently, there is approximately ten times the amount of oil and gas initiated surface disturbance in the Carlsbad Resource Area (CRA) as in the Roswell Resource Area (RRA). The total amount of surface disturbance to date caused by oil and gas activities in the RRA amounts to about 7,000 acres. The CRA has experienced about 32,000 acres of surface disturbance. It is difficult to estimate the past amount of cumulative negative impacts to cultural resources as a result of oil and gas facility construction. The main causes of damage to cultural resources have been primarily illegal artifact collecting and, to a lesser degree, inadvertent and illegal trespass. These impacts are particularly severe in the CRA, where oil and gas activity continues to be extensive. With sustained high levels of oil and gas development, the rate of loss of cultural resources has reached the point where existing practices are not adequately mitigating the loss.

Any surface disturbing activity has the potential to negatively affect cultural resources. The movement and loss of artifacts because of soil erosion is an indirect negative impact associated with project construction and other surface disturbing activities. Oil and gas development is the largest single surface disturbing activity in both the RRA and CRA and, therefore, causes a majority of the impacts. It is also likely that accidental damage from project construction destroys buried cultural resources, even though nothing is visible during surface inventories. There are two or three known instances per year of significant recorded sites being damaged during construction in the Roswell District by contractors failing to follow protective stipulations. Most negative impacts to cultural resources are permanent and irreversible. Cumulative impacts to cultural resources are difficult to estimate because for every known site that has been unexpectedly impacted, there are likely more damaged sites that are not discovered. Illegal artifact collecting increases as development increases and remains a significant problem, but the degree of impact is unknown.

Alternative B would offer the most additional protection to cultural resources in both the Roswell and Carlsbad resource areas, because it would withhold the most acreage from surface disturbance. Alternative A would provide the least additional protection. Alternatives C and D would provide more protection than Alternative A, but less than Alternative B. Alternative E is in between Alternative A and B in terms of providing added protection to cultural resources.

LANDS AND REALTY MANAGEMENT

In cases of proposed land transfers, eligible sites are either retained and protected with adequate buffer acreage by the BLM or are archaeologically treated before transfer. Thus, impacts to cultural resources occur only at the treated sites. Studying archeological and historic sites provides much needed information about the past, which is a benefit, but the process usually damages or destroys the sites at the same time. There is a slight possibility that one or two sites would be studied each year, depending on the availability of funding and manpower.

The negative impacts associated with construction in rights-of-way are mostly limited to illegal artifact collecting resulting from increased access. Nearly all projects are rerouted, when necessary, to avoid cultural sites. More access to an area usually brings increased public use, causing an increase in artifact collecting. The exception to avoidance of cultural sites is when it is not feasible to reroute large power lines. As a result, about one site is studied every two years in the Roswell District, because of power line construction.

RANGE MANAGEMENT

Significant cultural resources are usually avoided during the construction of range improvements such as fences, water tanks and pipelines. Indirect impacts, such as increased erosion from the construction of improvements, are minimal. Cattle trailing along fence lines can damage archeological sites, but the degree of damage by livestock is not known.

CULTURAL AND PALEONTOLOGICAL RESOURCE MANAGEMENT

The nominations of Haystack Butte and Cocklebur Lakes as National Register Archeological Districts under Alternatives B, C, D, and E, would better protect the cultural values in those areas from surface disturbing activities, than management under Alternative A. The various combinations of mineral leasing or entry closures, restrictions on surface use, avoidance or exclusion of rights-of-way, and limitation on OHV use in these areas, under Alternatives B, C, D, and E, would substantially reduce the likelihood of impacts to cultural resources.

All Alternatives except Alternative A, provide for interpretation of the Garnsey Bison Kill Site. By interpreting this site, both positive and negative impacts would occur. Benefits would include the learning experiences created by interpreting the site and the stabilization of erosion at the site. Negative impacts would include damage to part of the site from excavation work and the possibility of increased illegal artifact collecting due to visitation.

An additional opportunity for interpreting archeology would be Las Chosas, located on Tract 5 of the proposed Rio Bonito exchange. All alternatives except Alternative A provide for the interpretation of this site. The impacts of developing this site for interpretation would be the same as those for the Garnsey Bison Kill Site. Since the BLM would not acquiring the mineral rights on this parcel, protection from mineral development would not be possible, and damage or loss of cultural resources could occur.

For sites other than those specifically mentioned, the BLM would interpret archeological or historic sites at the rate of only one every three or more years. This means very few sites would be affected by work done to develop a site for public interpretation.

RECREATION MANAGEMENT

In the Roswell Resource Area, proposed increases in facility-based and dispersed recreational use under Alternatives B, C, D, and E, would increase visitation and intensify use. Illegal artifact collecting and damage to cultural resources from increased use would result. Under Alternatives B, C, D and E, designations of National Register Archeological Districts and subsequent intensive management at Haystack Butte and Cocklebur Lakes would reduce the possibility of damage to cultural resources by surface disturbance. Visitor use would be controlled and illegal artifact collecting would be reduced.

FIRE MANAGEMENT

The use of prescribed fire as a management tool and the suppression of wildfires can affect cultural resources by burning any combustible cultural materials and changing (heat treating) the characteristics of lithic materials. Building fire line by hand or with heavy equipment can damage cultural resources. Even so, the use of prescribed fire and the suppression of wildfire is believed to have had a minor impact overall on cultural resources.

MAROON CLIFFS ARCHEOLOGICAL DISTRICT

In the Carlsbad Resource Area, the unique cultural values in the Maroon Cliffs Archeological District have minimum protection from the effects of future oil and gas development. Under Alternatives A and C, only 1,880 acres of the 11,783-acre District are protected by a no surface occupancy stipulation. Hydrocarbon development in the Archeological District would adversely affect the research values for which it was established to highlight and protect.

Alternatives B, D, and E would offer increased protection of the cultural values in the Archeological District. The District would be increased in size from 11,783 acres to 17,720 acres. Under Alternative B, the entire District would be closed to future oil and gas leasing. Stringent interim conditions of approval would be imposed for proposed development within the area. Alternative

B provides the most protection of cultural resources from illegal artifact collecting, project-caused erosion, and inadvertent trespass.

Under Alternatives D and E, 10,880 acres would be closed to future oil and gas leasing. The remaining 6,840 acres would be designated open to leasing with no surface occupancy. In addition, strict interim conditions of approval would be applied to proposed developments within the entire area, to mitigate the direct, indirect, and cumulative impacts that would result from proposed development.

IMPACTS OF AREAS OF ENVIRONMENTAL CONCERN

Negative impacts to cultural resources from actions occurring in the proposed ACECs would be similar to those occurring on public lands not in the ACECs. These impacts primarily would be illegal artifact collecting, since surface disturbing activities would be restricted and resulting impacts would be minimal.

OVERFLOW WETLANDS ACEC

Prehistoric sites are expected to be buried under several feet of sediment in most of this proposed ACEC. Projects causing shallow surface disturbances probably will not impact these sites. There may be historic sites and paleontological specimens present. Cultural and paleontological values would be best protected by limiting land use. Alternative B would offer the most protection because it would limit surface disturbance by excluding major rights-of-way and would close the most acreage to disposal of salable, solid leasable and locatable minerals. Oil and gas leasing either would be precluded or leasing with no surface occupancy would be allowed. Alternative D provides the next most protection by imposing the same kinds of restrictions, but on fewer acres than Alternative B. Alternative A is the least restrictive of the alternatives, and would allow the most development and negative impacts to cultural and paleontological resources.

NORTH PECOS RIVER ACEC

Negligible impacts to prehistoric sites are expected in approximately half of this proposed ACEC because it is not likely to contain *in situ* prehistoric sites due to periodic sedimentation and erosion caused by the Pecos River. There could be some historic sites and paleontological specimens in the ACEC whose integrity would be preserved longer by limiting land use. Alternative B offers the most protection for cultural resources and paleontology because it would place the most limitations on surface disturbing activities, such as excluding rights-of-way in some areas and closing the most acres to disposal of salable, solid leasable and locatable minerals. Limiting surface disturbance limits impacts. Oil and gas leasing would be either precluded or leasing with no surface occupancy would be allowed. Alternative D provides the next most protection by imposing the same kinds of restrictions, but on fewer acres. Alternative A is the least restrictive of the alternatives, and would allow the most development and negative impacts to cultural and paleontological resources.

MESCALERO SANDS ACEC

Alternative B would be the most protective of cultural resources because it would be the most restrictive in terms of surface disturbance. Under Alternative B, the ACEC would be completely closed to OHV use and all oil and gas development would be subject to no surface occupancy. Alternative D would be the next most protective compared to Alternative B, with the main difference being that OHV use would be limited to designated roads and trails. Major rights-of-way would be avoided under Alternative C, but rights-of-way still could be authorized on a case-by-case basis. Alternatives B and D would exclude major rights-of-way. Impacts to cultural resources would occur more under C and A. Construction in rights-of-way would necessitate data recovery from some sites under Alternative C, increasing risk of illegal artifact collecting. Alternative A would exclude rights-of-way in most of the ACEC, but would allow for OHV use over most of the ACEC, increasing negative impacts.

FORT STANTON ACEC

Under Alternative A, some protection is afforded cultural resources because the area is closed to mineral material disposal. Limiting OHV use to designated roads and trails affords protection to cultural resources, as well. Alternative B provides the most protection for cultural resources by excluding major rights-of-way and closing all of the proposed ACEC to mineral material disposal. The intensive management of Feather Cave and Lower Stanton Ruin under Alternatives B, C and D would benefit the public by providing educational experiences. At the same time, vandalism and illegal artifact collecting could increase because of the visibility of the sites. Additionally, excavation and reconstruction work at Lower Stanton Ruin could damage cultural values.

An administrative site at Fort Stanton would benefit cultural resources because the presence of employees would discourage illegal artifact collecting. The building of recreational facilities would be a negative impact to cultural resources because increased visitation could increase illegal artifact collecting. Alternative C would cause the most negative impacts to cultural resources. The difference between Alternatives B and C is that under Alternative C, Lower Stanton Ruin would be developed as an interpretive site and mineral material disposals would be allowed throughout the ACEC, possibly impacting archeological sites. Alternative D is a compromise between B and C in terms of surface disturbance and negative impacts. Under Alternative E, added protection would be given to these sites.

ROSWELL CAVE COMPLEX ACEC

Negative impacts to cultural resources would for the most part continue to come from illegal artifact collecting. Alternative B would limit visitation more than Alternatives C and D and, therefore, limit illegal artifact collecting.

IMPACTS OF MANAGEMENT COMMON TO ALL ALTERNATIVES

The no surface occupancy restrictions applied to oil and gas activities in state parks and recreation areas throughout the district would help to maintain those areas' visual quality and aesthetics for boating, fishing, hunting, and other recreational pursuits. Other benefits would include preservation of wildlife habitat and water quality.

Maintenance of the existing mining claim withdrawals would continue to benefit recreational opportunities and caves by protecting special areas from visual and ground disturbing activities.

Rights-of-way for roads, pipelines, and power transmission lines would detract from visual resources and back-country recreational opportunities and experiences. Impacts include direct loss of visual quality and displacement of watchable wildlife in the construction area. Moderate long-term impacts could result in the decrease of solitude and recreational experiences in semi-primitive non-motorized and motorized areas by increasing access to areas previously inaccessible by vehicle. The increased accessibility would also provide greater opportunities for motorized recreational use.

The continued development of the Valley of Fires Recreation Area as a full-service campground would contribute to meeting future recreation needs. As more recreation facilities are provided and visitation increases, impacts from public use are expected to increase. Where concentrations of recreationists are encouraged, opportunities for damage would increase, affecting facility condition and soil and vegetation health. However, because these impacts would be concentrated or channelized, corrective measures could be more easily applied.

The intensive management of permitted caves and limited regulation of non-permitted caves could control or reduce vandalism. Unregulated use allows cavers the freedom to visit one or more of nearly 190 non-permitted caves anytime they wish. Such use would have a negative impact on cave resources due to vandalism, littering, excessive group size and visitation, and removal of cave formations. Cumulative effects of unregulated visitor use in caves include negative impacts to bat populations (roost abandonment, colony disruption, T/E species destruction), biota and fragile cave formation destruction. If cave visitation continues to grow at the same rate as recent increases (about 7 percent annually), impacts such as bat roost abandonment, widespread vandalism and pollution could be severe.

The seasonal closure of Fort Stanton Cave from November 1 through April 15 annually would continue to benefit cave-adapted biota, especially wintering bat populations. This annual seasonal closure would have long-term benefits to bat populations because hibernacula would be protected from life-threatening human disturbances.

IMPACTS OF ALTERNATIVES

OIL AND GAS MANAGEMENT

Under all Alternatives, increased activity in expanding oil and gas fields would reduce the visual quality of the natural landscape, and would negatively affect semi-primitive recreation opportunities and the quality of recreational experiences in the Roswell District. Visual impacts would result from the presence of structures and equipment, both concentrated and dispersed. Scenic quality on approximately 60,000 acres of land in the Roswell Resource Area and approximately 370,000 acres in the Carlsbad Resource Area would be affected over the next twenty years. Although these impacts would occur mostly in Class III and IV VRM zones, impacts would still be mitigated to some extent by painting, requiring low profile facilities, restricting the amount of surface disturbance, and moving facilities or sites to less visually sensitive locations.

In the Carlsbad Resource Area, oil and gas activities would reduce semi-primitive nonmotorized and motorized recreational opportunities. In the Roswell Resource Area, semi-primitive nonmotorized and roaded natural recreational opportunities would be reduced.

Under Alternatives A and C, the cumulative effects of oil and gas development and production activities, such as H_2S outlets in karst, environmental contamination from drilling fluids, salt water disposal, construction of new roads, pipelines, power lines, and tank batteries, would negatively impact recreation resources in both resource area. Impacts would be far greater in the Carlsbad Resource Area than in the Roswell Resource Area, due to Carlsbad's higher volume of existing and potential wells.

Construction of oil and gas roads and pipelines would improve access; recreationists would not necessarily benefit. Temporary losses of certain kinds of recreational opportunity and long-term loss of visual quality are expected under all alternatives in areas of mineral development, especially oil and gas development.

The impacts of oil and gas development become significant when considering long-term effects of successive wells on both known and undiscovered caves. Long-term impacts of leaky casings caused by corroded pipes or poor cementing could allow hydrocarbons to leak into cave systems, threatening stability of cave ecosystems. Human safety could also be affected, resulting in serious injury or death from explosions or asphyxiation.

Under Alternatives B, D and E, the no surface occupancy designations, and closures to oil and gas leasing, would benefit both semi-primitive nonmotorized and roaded natural recreational opportunities. Additionally, in the Carlsbad Resource Area, semi-primitive motorized recreational opportunities would be preserved. In both resource areas, recreational opportunities would be greater under these alternatives than under Alternatives A and C, because more acreage would remain undisturbed. Other benefits would include fewer ground-disturbing activities, preservation of wildlife habitat and fewer above-ground structures and facilities.

Under all alternatives, drilling, completion, production, and abandonment of wells could increase negative effects on cave resources. Impacts include contamination of cave ecosystems from drilling fluids, oil and gas leakage, groundwater contamination, and surface disturbance from heavy equipment. The potential for drilling fluids, cement, hydrocarbons, and chemicals to enter cave ecosystems increases with each well drilled. Irreversible and irretrievable impacts to cave ecosystems and other natural and cultural resources associated with caves or karst could result. Alternatives A and C provide the least protection of cave resources, while Alternatives B, D and E provide the greatest protection from impacts of oil and gas development.

Protection of scenic quality would be greater under Alternatives B, D and E, than under Alternatives A and C, because NSO would be applied in more cases. Alternative C would have the greatest negative impact on visual quality because of the emphasis on oil and gas development. Visual intrusions associated with oil and gas development would impair the scenic quality of areas under development, until individual wells or fields are reclaimed.

OTHER MINERALS MANAGEMENT

Extracting mineral materials near caves or in karst areas could have adverse effects on cave and karst resources, under all Alternatives. Increased soil erosion and siltation could prevent normal water infiltration into cave systems and adversely alter speleothem growth. Additionally, excessive siltation and sediment loads in underground streams and pools would have highly negative impacts on the aquatic wildlife. Mining activities could further affect both water and air movement patterns and quality. Mining would be restricted in fewer areas under Alternatives A and C, and would have greater impacts to cave resources than under Alternatives B, D and E.

Air and water are major factors affecting cave growth and development, passage enlargement and speleothem growth. Any microflora or fauna within caves have evolved because of the balance between water and air. Mining activities could open new air passages to the surface, which would influence or alter normal cave temperatures and change the flow of air and/or water through caves, thus changing cave microclimates. The change from a constant microclimate could affect both the wildlife and mineral deposition in caves.

Recreational cave use could decrease and possibly become more hazardous, depending upon the degree to which air or water movements are altered, the amount of surface blasting, and other structural modifications that may occur. A cave could be completely destroyed if mining operations removed rock in which cave passages were formed.

Locating mineral material extraction sites adjacent to heavily travelled roads or within view of Special Recreation Management Areas would affect recreation-user experiences by decreasing visual quality, and by increasing heavy truck traffic, noise, dust and congestion. Under all Alternatives, lands closed or restricted from mineral leasing or disposal would provide increased protection to visual resources. The greatest protection would be afforded by Alternative B.

LANDS AND REALTY MANAGEMENT

Under all alternatives, except Alternative A, rights-of-way avoidance and exclusion areas would provide increased protection to visual resources. Under Alternative B, rights-of-way avoidance and exclusion areas would benefit recreational opportunities by reducing the proliferation of cross-country facilities and resulting ground disturbance and visual intrusions. Vegetation clearing, soil disturbance, and visual intrusions generally associated with major rights-of-way would detract from recreational opportunities. Increased access could benefit recreationists pursuing motorized vehicle activities, but negatively impact those who prefer solitude. Long-term impacts from rights-of-way would include reduced visual quality of the natural landscape, as seen from both the ground and the air.

The acquisition of inholdings in the Little Black Peak and Carrizozo Lava Flow wilderness study areas would enhance wilderness characteristics and provide improved recreational opportunities, under all Alternatives. Acquisition would eliminate incompatible inholding uses, reduce the likelihood of conflicts with landowners, and expand the area available for recreation. No impacts are expected in the WSAs from mining or mineral leasing.

Under Alternative A, the acquisition of as many as 2,000 acres of private lands within the Rio Bonito Valley, would benefit recreationists by providing low intensity recreational opportunities such as hiking, horseback riding, fishing, camping, nature viewing and photography. Under Alternatives B, C, D and E, an additional 1,000 acres could be acquired in the Rio Bonito Valley, further enhancing recreational opportunities. Under Alternatives C, D and E, new facilities along the Rio Bonito, such as river-side trails, interpretive exhibits and a full-service campground, could be provided on these lands. Impacts from recreation primarily would be from encouraging and concentrating use where none now exists. Impacts of visitor use, such as litter, soil compaction or erosion, vegetation loss, and scaring wildlife, would be controlled and repaired, when possible. Because those impacts do not now occur, they would be more obvious than similar impacts at an existing recreation site. Visitor use would be expected to increase annually as facilities are developed or improved.

Under Alternatives B and E, consolidation of land ownership through exchanges and acquisitions resource area-wide would provide more opportunity for recreation than Alternatives A or C, by increasing the availability of contiguous public land for recreation use.

The disposal of about 3,155 acres under Alternative A, and up to 150,000 acres under Alternatives B, C, D and E, would not have a major impact on recreational opportunities, because most lands are isolated tracts, with no physical or legal access for recreationists. Lands with excellent recreational or caving opportunities would be retained in federal ownership.

LIVESTOCK MANAGEMENT

Under all alternatives, livestock grazing in or near recreation sites, and riparian areas associated with those sites, would affect the quality of recreation experiences. Soil compaction and vegetation damage would continue to result from grazing in those areas. Visitor health and safety problems, such as manure and flies in campsites, movement of cattle through tented areas at night, and bedding of cattle in campgrounds, would continue to detract from quality recreational experiences.

The evidence or presence of livestock can negatively affect visitors who desire solitude, unspoiled landscape views or trail hikes without seeing signs of livestock. Controlled grazing can benefit wildlife-based recreation by dispersing water sources and allowing increased habitat diversity where rotational grazing systems are used.

OUTDOOR RECREATION MANAGEMENT

The development of the Billy the Kid Recreation Site under Alternatives C, D and E, would benefit fishermen and other day-use recreationists who value riparian settings or enjoy viewing wildlife. Adequate site management and vandalism of facilities would be of concern due to the distance of the site from the nearest BLM office.

Under Alternatives B, C, D and E, visitors to the Garnsey Bison Kill Site would benefit from interpretation of cultural and paleontological values at the site. Under Alternatives C, D and E, development of facilities and interpretive sites would be more intensive. Encouraging public use where none presently exists would create negative impacts in the form of litter, soil compaction, erosion (especially of arroyo banks), vegetation damage, vandalism, and potential loss of archeological or paleontological features.

The potential development of the alleged UFO crash site under Alternatives B, C, D and E, could benefit UFO enthusiasts. More intensive development would occur under Alternative C than under other alternatives. Creation of visitor use where none exists would produce impacts such as litter, soil erosion or compaction, vegetation damage and vandalism to any facilities and informal development of roads and trails.

Under all Alternatives, visual resources could be negatively affected by almost any activity allowed on public lands. In most cases the intensity of impact would be small, would occur in Class III and IV VRM zones, and would not be mitigated. However, in the oil and gas and mining industries the visual impacts could be great.

Cumulative impacts to visual resources in the Roswell District would result primarily from permitted surface disturbing activities such as roads, fences, buildings and facilities, pipelines, power lines, well pads, mining activities, pits and dams. Cumulative impacts of large numbers of unmitigated visual intrusions concentrated in Class II and III VRM zones could threaten visual quality and downgrade VRM classifications. No irreversible or irretrievable effects to resources are anticipated, although impacts to the landscape could last for decades. In all situations where visual resources are affected, impacts could be mitigated by design modifications, painting of all permanent surface facilities and equipment, or other practices, such as surface reclamation along utility corridors.

Off-highway vehicle (OHV) use under Alternative A, would continue, essentially unregulated. Lack of controls benefit OHV enthusiasts by allowing use throughout most of the resource area. Unrestricted OHV use would displace other types of recreational use in some instances and continue to cause soil erosion and compaction (especially on slopes), vegetation damage, harassment of wildlife and livestock, and damage to riparian areas. Extensive OHV use could negatively affect cave resources by increasing soil erosion into caves from the indiscriminate use of vehicles. Cave ecological processes would be disrupted. Extensive open designations benefit cavers from a convenience standpoint, by allowing easier access to public land caves. More restrictions on types and location of OHV use under other alternatives would reduce impacts on caves from OHV use.

Alternatives B, D and E would provide the greatest protection from OHV impacts to resources and values such as fragile archaeological and paleontological sites, trails, wilderness study areas, recreation areas, and caves. OHV closures or use limitations would reduce opportunities for recreationists who prefer to drive their vehicles off-road. Under Alternative C, the magnitude of environmental impacts of OHV use would be less than under Alternative A, but substantially greater than under Alternatives B, D or E.

Use of OHVs at the Haystack Mountain OHV area would be limited under Alternative A, because only two sections of public land are legally accessible. Trespass on adjacent private lands would continue. Areas at Mescalero Sands and Haystack Mountain designated specifically for OHVs would concentrate use, resulting in greater impacts to soil and vegetation. However, by channeling use to designated OHV areas, abuse and negative impacts to adjacent lands and resources should decrease.

Under Alternatives B, C, D and E, easement acquisition at Haystack Mountain would benefit OHV users and reduce impacts to adjacent landowners by providing adequate access, opening a larger area for ATV use, and clarifying designated use areas. Limitations on the size of OHVs would benefit ATV users by eliminating conflicts with dune buggies and large four-wheel drive vehicles. These alternatives would have a slight negative impact on motorcycle riders in terms of recreation experience quality, because they would have to share the area with ATVs.

Under Alternatives C and E, the designation of the 640-acre Dunahoo Hills Area as an intensive use area for ATVs would provide an additional recreation area for off-highway vehicles. By designating this area, illegal OHV use adjacent to U.S. Highway 70 should decrease. The visual resources along this highway corridor would be less affected by OHVs than at present.

WILDLIFE HABITAT MANAGEMENT

Under Alternatives B, C, D and E, wildlife viewing and hunting opportunities would increase from more intensive management of habitat. Hunting quality would improve with implementation of HMPs. Wildlife and fish habitat enhancement projects would provide greater consumptive and non-consumptive recreation opportunities by improving habitat so that populations could be enlarged and their ranges expanded.

FIRE MANAGEMENT

Under Alternative A, wildfire suppression in sinkholes or at cave entrances could have negative impacts on cave or karst resources if soil is disturbed during fire line construction. Above-normal accumulations of soil in caves or sinkholes could upset cave ecosystems or hydrologic processes. Soil erosion could threaten visitor safety on cave entry trails. The greatest protection would be afforded by Alternative B, by precluding fire line construction with heavy equipment within 400 meters of these features. Under Alternatives C, D and E, restrictions on fire suppression activities around caves and karst features would help protect caves by eliminating ground-disturbing activities within 200 meters around caves and karst features.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

The impacts of land management and use in proposed ACECs are generally the same as described above. Specific impacts to ACECs are discussed below.

OVERFLOW WETLANDS ACEC

Under Alternatives B, D and E, 3,000 acres would be excluded from major rights-of-way, which would produce long-term benefits to recreation opportunities. About 700 acres would become an exclusion area under Alternative C. Benefits could include protection from surface disturbing activities and human activity associated with maintaining right-of-way facilities. This would help maintain the outstanding wildlife viewing and hunting opportunities and the visual resources of the ACEC. Designating the remainder of public land in the ACEC as a rights-of-way avoidance area would reduce the possibility of rights-of-way crossing the ACEC. If rights-of-way were granted, construction would include the interruption of recreation opportunities. Creation of access along a right-of-way into undisturbed lands could cause the loss of waterfowl habitat, which would affect the quality of wildlife viewing and hunting in the area. Increased right-of-way access and maintenance could disturb the nesting and wintering waterfowl.

Under Alternatives B, D and E, acquisition of state and private land adjacent to, and in the ACEC, would contribute to long-term benefits for sportsmen and wildlife observers. Acquisition of lands would provide a buffer for wildlife hunting and viewing, and these recreation opportunities would be enhanced. Acquiring legal and physical access under Alternative C, would provide public recreation benefits.

Under Alternatives B and E, developing the wetlands as a "showcase" for one of the prime wetlands in New Mexico would produce significant benefits for the public, by providing additional recreational opportunities and activities associated with wildlife interpretation and education. Visitors would gain a better understanding and knowledge of the wildlife that visit or live within the Wetlands. Unintentional vandalism and wildlife depredations should decrease with informational or interpretive exhibits and trails that explain the fragile and irreplaceable ecosystems of the wetlands.

NORTH PECOS RIVER ACEC

Under Alternatives B and E, recreation opportunities would be enhanced in areas where mining, mineral leasing and rights-of-way development are restricted. These opportunities would be enhanced by preservation of natural conditions and the lack of disrupting activities that could degrade the natural quality of outdoor experiences. Conversely, land and mineral activity restrictions would reduce the availability of new routes for motorized recreation.

Easements to the Pecos River ACEC acquired under Alternatives B and E, would resolve conflicts and enhance management in situations where roads that originate from county or state roads cross private and state inholdings. Under Alternatives B, D and E, acquiring lands and public access in the ACEC would increase recreational diversity and opportunity and disperse use over a larger area. Acquisitions would benefit hunters, fishermen, birders, sightseers, nature photographers and hikers.

Under Alternatives B, C, D, and E, the development of fishing access points along the Pecos River would benefit fishermen. Interpretation of wetlands would benefit the public, by providing additional recreational activities associated with wildlife education. Unintentional vandalism and wildlife depredation should decrease with public information and interpretive exhibits and trails.

MESCALERO SANDS ACEC

Under Alternatives B and E, oil and gas leasing closures in the Mescalero Sands ACEC would enhance motorized and non-motorized recreational opportunities by reducing oil or gas exploration and production activities. Drilling and production equipment associated with such activity would be incompatible with user safety in an intensive recreational environment. Noise and odors from oil and gas exploration and production activity would also negatively affect users who visit other parts of Mescalero Sands for solitude and visual quality. Closures would also protect the ACEC core area from ground-disturbing activities associated with exploration and production.

Under Alternative A, retaining the public lands withdrawal from entry under the 1872 Mining Law would benefit recreational opportunities by preventing locatable mineral development. Under Alternatives B, C, D and E, the ACEC, including the National Natural Landmark, would be closed to mining and solid mineral leasing, which would protect the core area from ground-disturbing activities associated with mining.

The acquisition of private and state lands in the ACEC under Alternatives B, C, D and E, would have long-term benefits to recreation and wildlife management. Benefits would include improved manageability of plant and wildlife habitat, protection of the existing NNL, and acquisition of legal and physical access for non-motorized recreation.

Under Alternatives A and C, a large portion of the ACEC would remain open to livestock grazing and associated range management activities. This could negatively influence or impair natural ecological processes meant to be protected, and potentially degrade recreational experiences based on solitude and visual appreciation of the ACEC. Under Alternative B, exclusion of livestock grazing would have long-term benefits to the entire ACEC and recreational opportunities by reducing damage to vegetation and surface archaeological resources, and allowing natural ecological processes to occur. Under Livestock Alternatives D and E, impacts of grazing would be similar to Alternative A and C, except 640 additional acres would be excluded from grazing and no new range improvements would be constructed. Recreational opportunities based on solitude and visual appreciation would be enhanced only in the existing NNL.

Under Alternatives A, C and E, opportunities for motorized vehicle use would be increased. These opportunities, however, would have long-term direct and indirect negative impacts on the ACEC. With the exception of approximately 1,800 acres in the ONA that are closed to OHV use, additional roads (either constructed or developed simply through use), and negative by-products of OHV use (e.g., oil spills, litter, and disturbance of vegetation and stabilized dunes) could result.

Under Alternatives B and D, more nature viewing and hiking opportunities would be provided to visitors not using OHVs. While visitors wishing to drive into the dunes would be negatively affected by OHV closures, off-highway driving opportunities would exist on designated roads and trails adjacent to the ACEC and throughout the Mescalero Sands North Dune OHV Area.

FORT STANTON ACEC

Under Alternatives A and B, the ACEC would remain closed to mineral material disposal resulting in the long-term protection of recreational and cave resources.

Under Alternatives C, D, and E, mining mineral materials would impair visual resources in the vicinity of the activity until the mining site is reclaimed. During actual mining activity, noise, dust, and vehicles would negatively impact recreational experiences based on solitude and visual appreciation of the area.

Major rights-of-way would be excluded under Alternatives B, C, D and E, and avoided under Alternative C. This would result in benefits to recreation by protecting the ACEC from major surface disturbing activities, visual intrusions and activities associated with construction and maintenance.

Under all alternatives, land acquisitions would enhance public recreation opportunities by improving manageability of the Rio Bonito Campground, providing hiking access to Rio Bonito Falls and providing additional acreage for wildlife viewing, hunting and other recreational pursuits.

Exclusion of livestock grazing under Alternatives B, D and E, from campgrounds, trails, day-use areas, interpretive trails, waysides, overlooks and caves, would benefit recreation by eliminating conflicts between visitors and livestock.

Under Alternatives B, C, D and E, the designation of additional miles of multi-use trails would benefit recreationists who enjoy mountain biking, hiking and horse back riding. Increasing the number of trails in the Fort Stanton ACEC would allow recreationists to view back country wildlife and provide hunters a greater opportunity for hunting or wildlife viewing.

Under Alternatives B, C, D and E, camping restrictions would benefit recreation by protecting visual quality, reducing impacts to wildlife and habitat, decreasing the proliferation of roads, fire pits, soil compaction, vegetation removal and litter. Camping restrictions would negatively affect recreationists accustomed to driving or camping near the water's edge or next to a highway or developed area.

Designating a portion of Fort Stanton Cave as a National Scenic (or Historic) Trail under Alternative B, would benefit recreational caving by calling attention to the cave and interpreting its salient aspects.

Under all alternatives, the annual seasonal closure of Fort Stanton Cave from November 1 through April 15, would continue to benefit cave-adapted biota, especially wintering bat populations. This annual seasonal closure would have long-term benefits to bat populations because hibernacula would be protected from life-threatening human disturbances.

Under all alternatives, the OHV designation, limited to designated roads and trails, would benefit a variety of recreational opportunities and experiences. However, it would have a negative impact by restricting activities of those who participate in cross-country off-road driving.

ROSWELL CAVE COMPLEX ACEC

Under Alternative C, no surface occupancy designations would have a long-term benefit on recreation and cave resources by precluding drilling operations near caves.

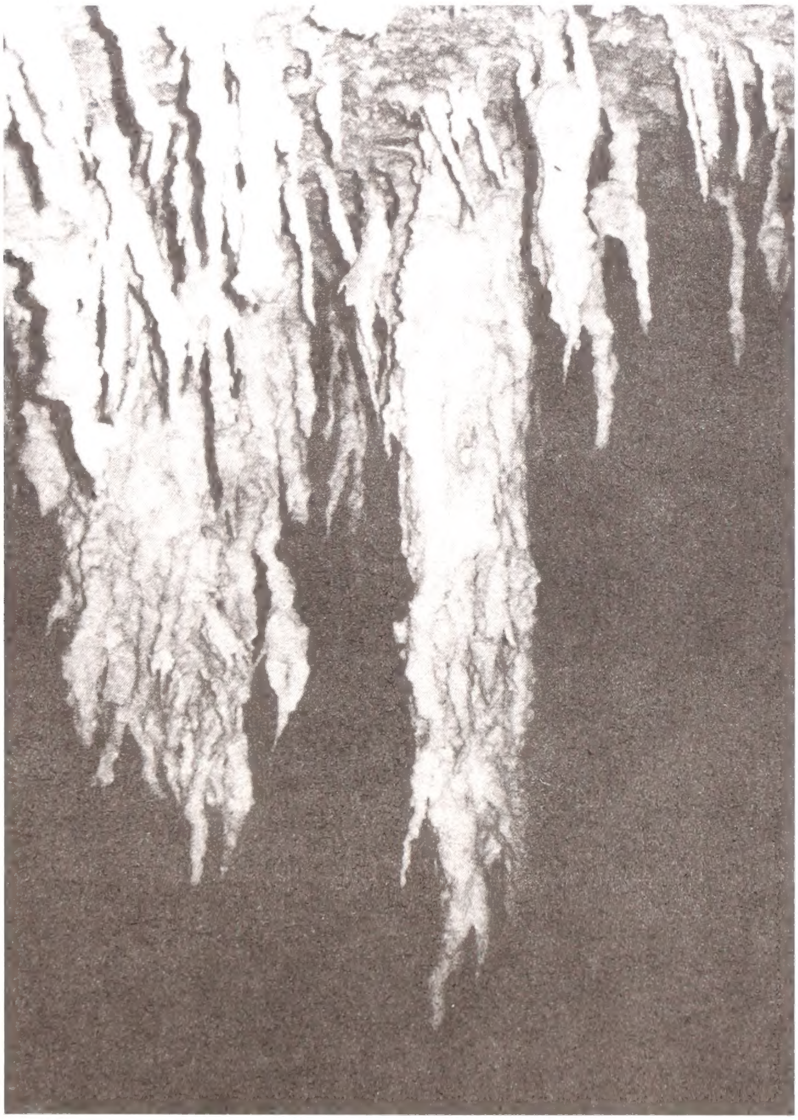
Major rights-of-way exclusion areas under Alternatives B, D and E, and avoidance areas under Alternative C would help protect caves by reducing surface disturbing activities. Construction in rights-of-way would have the greatest impact to caves under Alternative A, followed by Alternative C. Impacts associated with construction in rights-of-way include: accelerated erosion, surface disturbing activities, increased vehicle traffic, drilling, blasting, vegetation removal, and pollution and contamination from leaks and spills from ruptures or breaks in pipelines.

Under Alternatives B, C, D, and E, acquiring up to 4,920 acres of private lands would have long-term benefits for cave resources and recreation management. Improved manageability of cave systems, including better protection of bat populations, cave biota, and hydrologic systems would result. If private lands are not acquired, acquiring conservation easements would be a option. The easements would also have a long-term benefit on the manageability of cave systems and recreational use. Recreational caving opportunities would be enhanced by providing legal and physical access.

Under Alternatives B, C, D and E, cave exclosures would provide long-term benefits for cave resources and recreational opportunities by protecting watershed values, the health and safety of cave visitors, and fragile surface archaeological resources around cave entrances. Under Alternative A, long-term negative impacts to cave resources could occur if grazing is not excluded from active sinks or cave entrances.

Under Alternatives B, C, D and E, the closure of Bat Hole and Coachwhip caves would provide long-term benefits for bat populations and cave resources. The closure of these caves to recreation would have a negatively affect recreational use.

Under Alternatives B, C, D, and E, cave exclosures would benefit cave entrances, sinks, and fragile cave ecosystems. Accelerated erosion around cave entrances caused by off-road driving would decrease. Exclosures would have a negative impact on cavers who like to drive to the edge of cave entrances, and on OHV users.



Stalactities and many other types of speleothems (cave formations) occur in Roswell District caves.

EFFECTS OF SURFACE DISTURBING ACTIVITIES (GENERAL DISCUSSION)

Surface disturbances accelerate erosion rates beyond natural occurring levels. Reducing vegetative cover, damaging soil structure, exposing soils to wind, and concentrating surface runoff make soils more susceptible to erosion. Excessive soil loss leads to decreased site productivity, impairment of water quality, damage to aquatic habitat, increased flood risk, increased susceptibility to droughts, shortened life span of sediment control structures, and other negative impacts.

Soil losses can be effectively irreversible due to the slow rate of soil development. The loss of soil results in reduced forage production, as well as impaired watershed function. Without adequate soils, vegetative cover is reduced, leading to lower infiltration rates, greater and more rapid surface runoff during storms, higher peak flows during floods, and less groundwater recharge. This decreases discharge from springs, especially during droughts when it is needed most. With less vegetative cover and higher runoff rates, watersheds are even more susceptible to soil losses, further aggravating the problem.

STEEP SLOPES AND FRAGILE SOILS

Restricting occupancy and use on steep slopes could reduce soil losses by as much as 90 percent immediately following rehabilitation efforts when the site is most vulnerable to erosion. Reductions in soil loss would rapidly decrease as the site becomes revegetated.

Actual soil loss reductions would depend on site-specific conditions, natural baseline losses, type and extent of disturbance, number of disturbed sites, and mitigation measures used. Impacts due to mineral material extraction and OHV use are addressed under sections on Oil and Gas Activity and Recreation, respectively.

FLOODPLAINS

Encroachment on a floodplain can cause short and long term changes which can be concentrated at the disturbed site or dispersed over large areas. Detrimental effects from encroachment include increased flood hazard, increased sedimentation to the channel, gully initiation, decreased water retention, and decreased groundwater recharge. Secondary effects, such as impairment of water quality, damage to aquatic and riparian habitat, and shortened life span of sediment control structures are also possible. Some of these effects occur over decades as the system adjusts to the disturbance.

PLAYAS AND ALKALI LAKES

Playas and alkali lakes can be important ephemeral sources of surface water, and can be primary ground-water recharge areas (Haukos and Smith 1992). Buffer strips (where surface occupancy would be prohibited) would protect the rate and quality of ground-water recharge. Buffers would trap sediment being transported from uplands to the playas, preventing recharge areas from being sealed. Compaction of the recharge areas would also be reduced or eliminated. The quality of ground-water recharge would be protected from accidental contamination by providing additional opportunities for containment, dilution, or breakdown by soil microbes prior to reaching recharge areas.

A buffer would protect the rate and quality of discharge water from springs and seeps in a manner similar to the protection of recharge water at playas. Compaction and sedimentation of springs and seeps, which can slow or stop spring discharge would be prevented.

The benefits of a buffer at cave/karst features are similar to those identified for playas. However, the need to prevent contaminant movement from the surface to ground water is more important because of the rapid movement of ground water in karst topography.

IMPACTS OF ALTERNATIVES

OIL AND GAS MANAGEMENT

The most significant effect of oil and gas activity on soil and water resources is soil erosion. Table 105 shows estimates of cumulative soil losses due to various surface-disturbing activities. Appendix 18 lists assumptions made in the analyses.

Acess roads and pipeline rights-of-way account for the majority of soil losses due to the large area of disturbance, their long slope lengths, and their relatively steep slopes. Mineral pits and well pads can also contribute relatively small amounts.

Analyses indicate that in the CRA properly constructed well pads that are compacted and covered with caliche can have lower soil losses than undisturbed sites. However, the amount of soil loss associated with well pads is relatively small. Also, difficulties in revegetating pads once abandoned make them susceptible to long term soil losses.

The estimate of soil losses due to oil and gas activities assumes construction and maintenance is performed according to standard operating procedures. Local effects, such as gullying could be severe if appropriate mitigation measures are not taken. Mitigation could include providing proper drainage for roads, properly constructing and maintaining well pads, and ensuring adequate revegetation efforts.

OTHER MINERALS MANAGEMENT

Although soil loss estimates from mineral material pits are relatively small, site specific impacts could be significant. Gully initiation could occur, especially in highly erodible soils in drainages. Pits could also be an additional source of sediment that could eventually add to the cumulative sediment load in the Pecos River.

Alternative B would reduce the cumulative impacts from mineral pits in terms of sedimentation and lost site productivity. Alternatives A, C, D, and E would do so to a lesser extent.

VEGETATION MANAGEMENT

The primary objective for watershed protection under the desired plant community (DPC) concept is to maintain an adequate vegetative cover. The benefits provided by an adequate vegetative cover include: (1) *promotion of soil structure* by incorporating organic matter into the soil, enhancing microbial activity, and protecting the surface against compaction and surface disturbance by livestock, vehicles, and other users;

(2) *reduction of erosion rates* by protecting the soil surface against raindrop impact and wind, reducing the amount and peak rates of surface runoff, and dissipating the energy of surface runoff, thereby reducing its ability to detach and transport soil particles; and (3) *enhancement of water availability* byincreasing infiltration rates, increasing available soil water and ground-water recharge, and decreasing net evapotranspiration rates. Secondary benefits would include improved water quality (less sediment, dissolved salts and other substances moving via overland flow), improved site productivity (maintaining soils on-site and increasing fertility and available soil moisture), and reduced flood hazards.

Implementation of DPC would have short and long term effects. Long term soil losses would be the same for all alternatives and are shown in Table 106. Achieving the DPC for all communities would reduce soil losses from public lands in the Roswell Resource Area by approximately 50 percent.

Short term impacts would vary slightly among alternatives due to differences in practices and constraints used to achieve the DPC (see Chapter 2, Vegetation Management). Short term effects are difficult to quantify because of the variability in the types of treatments, their areal extent, and site-specific conditions at treatment locations.

The lag period and temporary "buffers" proposed for chemical treatments under Alternatives C, D, and E would reduce the chance of harmful cumulative effects from excessive pesticide applications by dispersing treatments over an area and over time.

TABLE 105

ESTIMATES OF CUMULATIVE SOIL LOSSES DUE TO SURFACE DISTURBING ACTIVITIES SOIL LOSSES FROM RILL/INTERRILL EROSION IN THOUSANDS OF TONS FOR THE ROSWELL DISTRICT OVER A 20-YEAR PERIOD.

Activity	Cumulative Soil Loss Due To Activity	Cumulative Soil Loss Due To All Sources	Soil Loss Due To Activity As Percentage of To All Sources
	Roswell Resource Area		
Mineral Pits[1]	3.78/3.35[2]		0.0028/0.0025[2]
Well Pads	1.16		0.00087
Rights-Of-Way	194	133,000[3]	0.15
Access Roads	183		0.14
RRA Total	382		0.29
	Carlsbad Resource Area		
Mineral Pits[1]	15.5/15.3[2]		0.017/0.016[2]
Well Pads	-0.80		-0.00086
Rights-Of-Way	506	92,500[4]	0.55
Access Roads	354		0.38
CRA Total	875		0.95
	Roswell District		
Mineral Pits[1]	19.3/18.6[2]		0.0085/0.0082[2]
Well Pads	0.36		0.00016
Rights-Of-Way	700	226,000	0.31
Access Roads	537		0.24
RDO Total	1,260		0.56

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[1] Soil losses from mineral pits resulting from all demands for saleable minerals; highest demand from the oil and gas industry.

[2] First figure refers to Alternatives A, C, D, and E (three pits per year would be reclaimed); second figure refers to Alternative B (six pits per year would be reclaimed).

[3] Soil losses from all sources in Chaves and Roosevelt Counties.

[4] Soil losses from all sources in Lea and Eddy Counties.

Source: BLM files, 1994.

TABLE 106

ESTIMATES OF LONG-TERM ANNUAL SOIL LOSSES FOR EXISTING VEGETATIVE COVER AND THE DESIRED PLANT COMMUNITY. PREDICTED SOIL LOSSES DUE TO RILL/INTERRILL EROSION IN THOUSANDS OF TONS PER YEAR FROM PUBLIC LANDS IN THE ROSWELL RESOURCE AREA.

Community Type	Estimated Public Land Acres	Estimated Soil Loss In 1000s of Tons Per Year Existing Vegetative Cover	 Desired Plant Community
Grassland	838,000	180	110
Shinnery Oak-Dune	270,000	28	8.4
Mixed Shrub Malpais	*	*	*
Pinyon-Juniper	114,000	61	35
Mixed Desert Shrub	238,000	180	71
Drainages, Draws, Canyons	30,000	6.0	2.5
Total Annual Soil Loss	1,490,000	460	230
Total Soil Loss Over 20-Year Period	1,490,000	920	460

Assumptions: 1. All soil loss numbers are reported to two significant figures. 2. Soil losses from Malpais are negligible. 3. Only soil losses from BLM lands are estimated. 4. Vegetative cover under DPC is assumed to be the arithmetic average of the minimum and the maximum percentages of bare ground and canopy cover shown under the percent-cover column in tables in the Vegetation Management section of Chapter 2. 5. Soil losses are due to rill/interrill erosion only. Soil losses from other forms of erosion, such as gullying, streambank erosion, and other processes are assumed to be proportional to soil losses due to rill/interrill erosion. This tends to minimize the difference in soil loss estimates in the existing condition and DPC condition for Drainages, Draws, and Canyons.

Source: BLM files, 1994.

The effects could include contamination of surface or ground water, and exposing large areas to erosion in the short term.

Under Alternative B, no chemical treatments would be performed, thus eliminating potential pesticide contamination of soils and surface or ground water. However, alternative practices such as grazing, prescribed fire, and mechanical treatments have other negative effects, including damage to soil structure which can decrease infiltration and reduce available soil water and ground-water recharge; exposure of soils to wind or water erosion; and increased sedimentation to streams.

Higher rates of use of annual plant production under Alternatives A and C could result in greater impacts due to increased exposure to wind and water erosion, and more soil disturbance. The effects would tend to be short-term and concentrated in the areas of heaviest use, assuming the trend in vegetative cover is toward the DPC. Soils would be less prone to short term erosion under Alternatives D and E.

Assumption 3 should read, "Vegetative cover under DPC is assumed to be the arithmetic average of the minimum and the maximum percentages..."

RECREATION MANAGEMENT

Impacts from recreational site development along the Rio Bonito (Tracts 1-4) would be due to construction, and ongoing use of the site once developed. Dirt roads, trails, and parking areas proposed under Alternatives A, B, D, and E would create a long-term source of sediment. Soils of the surrounding uplands where access roads would most likely be located are shallow and extremely susceptible to water erosion (USDA Soil Conservation Service 1983a). Proper design and ongoing maintenance would be required to prevent sediment loading to the Rio Bonito. Also, the short-term threat of sedimentation during construction would be severe unless necessary mitigative measures were taken.

Under Alternative C, a gravel surface could greatly reduce soil losses from roads and parking areas, and would be desirable for protecting soils, water quality, and aquatic habitat. Due to improved access, some protection afforded by the gravel surface may be partially offset by increased use of the site. However, the difference between alternatives is not expected to be great.

Hiking, wading, and fishing from the banks would cause some degradation of the stream channel. Increased sedimentation from these activities, and other wastes would impair water quality to some degree. Due to the Rio Bonito's unique quality, its level of development, and water demands, cumulative effects are particularly important. Sources of sediment exist upstream of the acquired reach, and impair water quality, aquatic habitat, and recreational opportunities. Any recreational development would have to limit additional sources of sediment and other contaminants to the extent possible.

Watershed impacts at the Billy the Kid Recreation Site would be similar to those on the acquired Rio Bonito lands. Cumulative impacts would be less severe because the area is smaller and would have fewer visitors.

The Garnsey Bison Kill Site is along ephemeral drainages that flow to Dimmit Lake. Soils in the drainages are highly susceptible to water erosion, so construction in the drainages would generate sediment that would flow to the lake during storms. A buffer located below development and above the drainage would mitigate much of the erosion effects. Locating development on upland soils that are less erodible and less steep would result in less sedimentation.

By disturbing the soil surface, off-highway vehicles (OHVs) compact the soil, expose soils to accelerated wind and water erosion, and reduce the amount and diversity of vegetation (Stebbins 1974, as reported by Bury et al. 1976). Cumulative impacts could be reduced by concentrating use of OHVs to areas of intensive management. Sensitive areas could be protected, and impacts would be mitigated in areas of intense use.

Although Alternatives B, C, D, and E would provide increased emphasis on OHV management by limiting OHV use to designated roads and trails, continued use on highly erodible soils, illegal use, and route proliferation would still be difficult to control. Alternative A would keep more than one million acres open to OHVs, and would lead to more watershed degradation than the other alternatives.

Differences in impacts among the alternatives are due primarily to differences in total acreage proposed to be closed to OHV use, and the size of buffers proposed to protect site specific resources (e.g. playas, springs, lakes).

Alternative B would afford the greatest protection of water sources. Rarely would OHV impacts affect a playa, lake, spring, or seep located 400 meters away. Exceptions would occur on steep slopes where runoff is rapid and OHV impacts are severe in the drainages. In these cases excessive sedimentation would be the most serious threat. The 200-meter buffer specified in Alternative D would also adequately protect most sources.

Under Alternatives C and E, impacts could be severe. Even when roads and trails are maintained to stringent standards, high-intensity storms could cause significantly more sedimentation to water bodies. Roads and trails adjacent to springs could damage the source and reduce discharges. Also, contaminant spills (e.g. petroleum products) would be flushed directly to the water source and seriously impair water quality.

WATERSHED MANAGEMENT

Water is an extremely important resource in the District, often being the limiting factor in agricultural, industrial, and municipal functions. As such, protection of the quality of surface and ground water is imperative.

Best Management Practices (BMPs) would protect water quality by specifying the most appropriate techniques for industrial operations, construction, vegetation treatments, and other management actions. BMPs would mitigate the effects of sedimentation, thermal pollution, nutrient loading, the introduction of pesticides, volatile organics, and other contaminants to surface or ground water, and any other form of nonpoint source of water pollution. Monitoring BMPs would demonstrate benefits and direct adjustments over time.

Under Alternative B, no degradation of water quality would be permitted whenever practicable. This would provide excellent protection of water resources, but would often prove uneconomical and prohibit effective management. For example, a vegetation treatment that results in short-term sedimentation of a stream that is barely detectable above natural levels would be prohibited.

Only actions resulting in economic returns or environmental benefits that would exceed any environmental degradation would be permitted under Alternatives D and E. Careful attention would be given to actions that would result in short-term gains, but would cause long-term degradation of water quality, such as mineral development or grazing on sites that are prone to chronic soil loss. Actions affecting ground-water quality would be particularly serious because of people's reliance on the resource, and the difficulty and expense of clean-up once contaminated.

BLM policy requires that a DRASTIC analysis of ground-water pollution potential be performed prior to chemical treatments of vegetation. On a regional scale, most of the Roswell District is categorized as moderately vulnerable to ground-water contamination (U.S. Environmental Protection Agency 1987, as reported in USDI Bureau of Land Management 1991).

Conducting a site-specific DRASTIC analysis would provide more precise information on a project area. Therefore, chemical treatments that would potentially contaminate ground-water would be prohibited or modified, and chemical treatments that are safe and effective would be allowed.

Under Alternative B, virtually any potential for ground-water contamination would be eliminated. However, it is possible that environmentally safe chemical treatments would be prohibited, and more damaging mechanical or biological treatments used instead. Alternatives C, D, and E would require more detailed information in deciding whether to prohibit, modify or proceed with a chemical treatment. Pesticides would then be used only when the assessment of all options suggest that chemicals are the safest and most effective treatment available.

WILDLIFE HABITAT MANAGEMENT

All alternatives propose efforts to control salt cedar on the Pecos River, Rio Bonito, and Salado Creek. Alternative A also proposes treatment at the Overflow Wetlands. Evapotranspiration rates could be reduced, thus enhancing water availability through increased ground water storage, spring discharge, and stream base flow.

Salt cedar was originally planted for streambank stabilization and flood control. Streambank stabilization proposed under Alternatives B, C, D, and E could replace this function of the removed salt cedar, and should be considered in any salt cedar control plan. Stabilization efforts could reduce bank scour and sloughing along other stream reaches without present stands of salt cedar. Indirect benefits would include improved water quality, improved aquatic and riparian habitat, and enhanced recreational opportunities.

Spring or riparian exclosure fences, plantings, and other enhancement efforts would improve the natural function, productivity, and diversity of these resources, thus providing several benefits. Among them are enhanced water availability, improved water quality, and natural flood control. Indirect benefits would be provided for wildlife, recreationists, and other water users.

Agricultural practices and moist soils management along the Rio Bonito would require irrigation. Total water demands would depend on the type of feed grown, the total area to be irrigated, precipitation, and how much loafing and nesting habitat would be flooded. It is expected that a fraction of the water rights obtained in the acquisition of riparian lands along the Rio Bonito would accomplish these objectives during most years. Sediment and nutrients would also be delivered to the Rio Bonito from irrigation return flows and the cultivated lands.

Alternatives B, C, and D would increase the number of available water sources in the Resource Area. Providing more water sources would disperse livestock herds and wildlife populations, moderating localized impacts near existing sources. Impacts that would be reduced include overuse of surrounding vegetation, compaction of soils, accelerated erosion rates and gully initiation, and concentration of water pollutants, such as nutrients and coliform bacteria associated with animal waste.

Proper planning of water developments is necessary to disperse livestock and wildlife. Benefits could be negated by developing waters near an existing source, placing mineral blocks near the waters, or concentrating animal use in other ways.

FIRE MANAGEMENT

Prescribed fire provides indirect benefits for soil and water resources as a vegetation management tool. First, prescribed fire is a means to achieve the desired plant community which has watershed protection value. Second, managing fuel loads reduces the risk of wildfire which often leads to severe damage by burning too much vegetation and heating the soil excessively, exposing the area to accelerated erosion rates, and making revegetation difficult. Also, fire fighting measures, such as construction of fire lines are often more damaging than the fire itself.

Secondary impacts from wildfire can also be significant. Soil losses lead to reduced site productivity, sedimentation of waters, impaired water quality, and impaired riparian and aquatic habitat. Effects can persist for years, and when soil losses are high, effects can be irreversible. Impacts to soil and water resources from suppression efforts would be partially mitigated during wildfires by tailoring suppression tactics in a manner which is less harmful to the environment.

Resource damage due to suppression efforts would be least under Alternatives B and E because these propose the most restrictive use of bulldozers, engines, and retardant drops around cave/karst areas and on steep slopes. Fort Stanton, the Overflow Wetlands, Valley of Fires, Border Hills Structural Zone Natural Landmark, and playas could suffer surface disturbance by bulldozers and engines and temporary impairment of water quality by retardant drops.

Short-term negative impacts associated with prescribed fire include construction of fire control lines, temporary loss of vegetative cover, and exposure of soils to erosion. However, vegetation usually recovers quickly and negative impacts are typically undetectable within a year.

The benefits of prescribed fire as a vegetation management tool would be greatest under Alternatives C and E which propose the greatest acreage to be treated annually. Alternatives B and D would be less effective, having fewer acres proposed for treatment, and Alternative A would be least effective with the fewest acres proposed for treatment.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

OVERFLOW WETLANDS ACEC

To control salt cedar, Alternatives B, D, and E allow no use, hand application, or aerial application of chemicals, respectively. Chemical treatments adjacent to the river could impair water quality somewhat in the short-term. Overspray or drift would be significant for aerial applications only. Individual project areas are usually not extensive, therefore would not be significant in the long-term. The BLM should coordinate with other salt cedar control efforts on the Pecos River to avoid adverse cumulative effects.

The ACEC would protect approximately five miles of the Pecos River corridor. Restricting surface disturbances and OHVs would allow banks to stabilize and riparian vegetation to become established throughout the reach. Coupled with grazing adjustments and salt cedar control, a positive change in the function of the floodplain would be expected. Benefits would include the natural moderation of floods, maintenance of water quality, and enhanced groundwater recharge. Secondary benefits would include improved aquatic and riparian habitat, and improved scenic quality.

Similar benefits would be expected on the wetlands and surrounding uplands. Benefits would be most pronounced under Alternatives B, D, and E where OHV use would be limited to designated roads and trails.

Disturbances in the uplands would probably increase the rate of sedimentation to the wetlands. A fairly consistent discharge of approximately five cubic feet per second flows from Lea Lake at Bottomless Lakes State Park through the wetlands. Flow through the wetlands could become confined to a more well-defined channel, decreasing the extent of the wetlands, but evolving to a more productive riparian habitat along the channel.

NORTH PECOS RIVER ACEC

The ACEC would protect approximately 13 miles of river corridor. Restricting surface disturbances and OHVs would allow banks to stabilize and riparian vegetation to become established throughout the reach. Coupled with grazing adjustments and salt cedar control, a positive long term change in the function of the floodplain would be expected.

Some benefits of the ACEC may be apparent within the ACEC, but may not significantly reduce the cumulative effects of the restricted activities. For example, minerals extraction that may have occurred if the ACEC was not established could still occur outside the ACEC. Any soil losses, sedimentation, and impairment of water quality would occur in a location outside the ACEC. Cumulative effects could actually be more severe by restricting use in the ACEC. Closing a portion of the ACEC to OHVs protects the ACEC, but displaces them to other areas that could experience chronic soil losses and degradation.

MESCALERO SANDS ACEC

Alternative B specifies the greatest restrictions on surface disturbance in the proposed ACEC, limiting surface disturbance and exposure to wind erosion in the short-term. The Dune and Roswell-Jalmar complex soils of east Chaves County are excessively drained sands (USDA Soil Conservation Service 1980). None of the area is prone to water erosion, but the shifting dune sands are naturally unstable, and the entire area is highly susceptible to wind erosion. When the surface is disturbed, exposure to wind is increased and revegetation is difficult. Excluding surface disturbance would minimize wind erosion and give vegetation the best chance to become established.

Alternative C allows the greatest potential for surface disturbance, though none of the impacts are likely to be severe. Impacts due to rights-of-way would be short-term in terms of wind erosion and loss of vegetation, and the NSO stipulation for oil and gas leasing avoids surface disturbance within the ACEC boundary.

Fewer acres excluded from livestock grazing could have watershed benefits. If stocking rates and timing are strictly controlled, livestock grazing could be an effective vegetation management tool, especially in areas where the use of prescribed fire is limited by light fuel loads, and chemical treatments are prohibited.

Alternatives A, D and E have restrictions greater than C and less than B, which closes all public lands in the ACEC to OHV use. Because OHV use is the most significant impact, Alternative E, followed by Alternative A, would provide more protection of the ACEC than Alternative D.

Cumulative effects associated with OHV use could be severe because the ACEC would allow continuous intensive use by OHVs. Exposure to wind erosion would be extensive and vegetation would be unable to effectively reestablish itself. However, the net effect of allowing OHVs in the ACEC could be beneficial by providing a location for intensive management of OHVs.

FORT STANTON ACEC

Construction activities requiring ROWs can lead to significant soil losses and consequent impacts to water quality, and riparian and aquatic habitat. Restrictions proposed under Alternative B would result in the fewest short-term impacts from surface disturbance.

Restricting disposal of mineral materials under Alternative B would not have a significant effect due to the limited area and degree of disturbance. However, mineral pits can have localized impacts. Under Alternative B, mineral disposal is limited to existing disturbances, therefore additional local impacts are avoided. Under Alternatives C and D, each new proposal would have to be evaluated for local impacts.

As discussed under the Mescalero Sands ACEC section, restricting livestock grazing prohibits its use as a vegetation management tool that could have long-term benefits when proper stocking rates and seasons of use are observed. Alternative C would allow livestock grazing throughout the proposed ACEC, which could lead to upland and riparian degradation if not strictly controlled. Secondary impacts to water quality, aquatic and riparian habitat, recreational opportunities, and scenic quality would also result. Limiting or excluding livestock grazing from riparian and highly erodible areas under Alternatives D and E, would protect watershed function, while maintaining the flexibility to manage vegetation elsewhere with grazing.

ROSWELL CAVE COMPLEX ACEC

Some activities restricted under the Roswell Cave Complex ACEC have had impacts discussed previously in this section. General watershed impacts are discussed under the general discussion of Effects of Surface Disturbing Activities. Impacts due to OHVs, recreational facility development, and fire suppression efforts are discussed under Impacts of Alternatives.

Alternatives B and E would afford protection of ground water by restricting hazardous substances within cave exclosures. Fence exclosures would prevent soil disturbance by livestock, and resulting sedimentation to cave entrances.

A BLM Fire Crew constructs a watershed protection project.

IMPACTS FROM MANAGEMENT COMMON TO ALL ALTERNATIVES

The loss of bats, neotropical migratory birds, waterfowl, and other nongame bird species would be lessened by the netting requirements of disposal pits and tanks associated with oil and gas development. Likewise, losses of these species would be reduced by the requirement to cap vent stacks of oil and gas production equipment.

Management of 45 allotments according to existing allotment management plans (AMPs) generally would improve the quality of wildlife habitat. Plan implementation, or revision of existing AMPs with wildlife considerations, would have long-term benefits to wildlife and habitat by specifying utilization of key plant species to increase forage production and cover, and improving the vegetative condition of important plant communities and habitat for T/E species. Other benefits would be diverse habitat conditions and enhanced wildlife abundance and distribution, and protection of essential habitats for T/E species.

Prohibiting construction of new netwire fences on public lands would have direct long-term benefits for existing pronghorn antelope herds by avoiding additional restrictions that prevent their free movement to areas which provide better forage (ability to follow rain shadows). Netwire fencing reduces habitat that would otherwise be available to pronghorn, resulting in substantial long-term negative impacts on pronghorn populations.

Limiting recreational visitation of certain caves annually from November 1 through April 15 would protect wildlife species that use these special habitat features for shelter, nesting, hibernating and foraging. Long-term benefits to cave biota, specifically hibernating bat populations, would include the avoidance of bat losses or abandonment of cave habitats by bats and other wildlife species that use the caves. Prohibiting the disposal of human wastes in resource area caves would preserve the biological integrity of the caves, resulting in stable populations of cave biota and prevention of groundwater contamination.

The continued closure of about 900 acres to OHV use in the Comanche Hill area would benefit wildlife and habitat in the immediate area by reducing wildlife harassment and destruction of habitat from OHV use, and would continue to prevent waterfowl disturbance at the Bitter Lakes National Wildlife Refuge.

Maintaining grassland habitat through the control of mesquite, cholla, creosote and snakeweed would have long-term benefits for T/E species such as the mountain plover and Baird's sparrow that rely on the shortgrass community for their existence.

IMPACTS OF ALTERNATIVES

In this section, the effects of oil and gas development and the Surface Use and Occupancy Requirements (Appendix 3) on wildlife and wildlife habitat are discussed in detail. Following that discussion, the effects of other actions proposed in the alternatives are analyzed. Finally, the effects of ACEC designation are described.

OIL AND GAS, SURFACE USE AND OCCUPANCY REQUIREMENTS

Under all alternatives for the Roswell District, typical geophysical exploration operations would displace wildlife from the area of disturbance during the operation. Wildlife would return once operations were complete. Three-dimensional geophysical exploration activities would increase habitat disturbance seven-fold due to the concentration of seismic lines in a grid pattern over a specific area. Creation of new roads from repeated vehicular travel during geophysical exploration, and possible continued use by the public, would reduce the area of undisturbed wildlife habitat, thereby decreasing the quality of habitat for prairie chickens, raptors, mule deer and pronghorn antelope. Increased disturbance and human access would directly impact important habitat features such as booming grounds, nesting areas, and fawning areas. There would be cumulative negative impacts to wildlife habitat resulting from repeated geophysical activity conducted in the same area over time, particularly 3-D geophysical operations.

Under all alternatives, future oil and gas development would initially result in the direct loss of wildlife habitat. About 11,200 acres would be lost from construction of production facilities, about 16,200 acres from road construction, and about 3,600 from pipeline construction. Oil and gas field development would have negative, long-term cumulative impacts to wildlife habitat due to the magnitude and concentration of surface disturbance, such as oil and gas pads, pipelines, access roads, and power lines, and associated human activity in the area. A potential increase in illegal harvest of mule deer, pronghorn antelope and prairie chicken is possible when more human activity is occurring in the general area. Wildlife abundance and diversity is expected to decrease. These areas would not be fully reclaimed and portions would remain unusable for wildlife for 20 years or more.

Developed oil and gas fields would continue to have long-term negative impacts to wildlife populations and habitat due to the operation and maintenance of producing wells, pipelines, and access roads. The loud, non-electric motors associated with pump jacks and compressors are the main noise affecting the booming activities and nesting activities throughout prairie chicken habitat. Wildlife displacement from noise and visual intrusions would continue to occur within established fields.

Under all alternatives, surface use and occupancy restrictions to limit oil and gas development in state-listed endangered dunes sagebrush lizard habitat and in lesser prairie chicken habitat are needed. This crucial habitat type found on adjacent private and state lands is not afforded the protection that is given to public lands, making the public lands even more significant as preserves for prairie chickens, dunes sagebrush lizard and the shinnery oak-dune community.

Under Alternatives A and C, suitable and occupied habitat for the state-listed endangered dunes sagebrush lizard may be directly impacted by future oil and gas surface disturbing activities. Microhabitats would be lost and lizards displaced, potentially causing a decline in lizard populations. Several wildlife monitoring sites for the lizard may be directly impacted, or the studies compromised, resulting in the loss of important habitat and monitoring information.

Under Alternative B, habitat for the lizard would be protected with a no surface occupancy stipulation, beginning 200 meters from suitable habitat. The long-term protection of crucial habitat and populations throughout the Mescalero Sands ecosystem would result.

Under Alternatives D and E, suitable habitat located within "occupied habitat" would be protected by a 100-meter no surface occupancy stipulation, resulting in the protection of microhabitats while allowing oil and gas development to occur in non-suitable habitat.

Under Alternative A , timing restrictions on about 1,091,600 acres of prairie chicken habitat in the Roswell District would benefit prairie chicken populations during the peak booming period and the beginning of the nesting period (April 1 through May 31). There would be long-term negative impacts to lesser prairie chicken habitat. Potential impacts include the loss of significant booming grounds established prior to April 1 and disturbance of nesting habitat during the nesting period resulting from oil and gas lease development. The long-term cumulative impact in the Roswell District would be a decrease in prairie chicken populations and habitat condition for prairie chickens and other game and nongame wildlife species inhabiting the shinnery oak/dune ecosystem.

Impacts under Alternative C are largely the same as Alternative A, except for an increase in habitat in the Carlsbad Resource Area, where timing and lek-avoidance stipulations would apply. In the Carlsbad Resource Area, oil and gas development in the 162,822-acre area where the timing stipulation currently applies has resulted in the destruction of leks and nesting habitat, and has caused prairie chickens to move to other areas. Often times these other areas do not meet the habitat requirements for prairie chicken. In the long-term, impacts in this area could continue to cause prairie chickens to move to other areas, and cause further destruction of leks and habitat. Applying the timing stipulation to an additional 297,879 acres of habitat will allow management to focus on the protection of leks and habitat outside of the prairie chicken area originally designated in the Carlsbad RMP. Under this alternative, the total acreage in the Carlsbad Resource Area affected by the timing stipulation would be about 460,700 acres.

Under Alternatives B and E, applying an extended timing restriction (from the beginning of the booming period through the end of the nesting period, March 1 through June 30) over about 1,395,415 acres of habitat in the Roswell District would further benefit populations. Extending the timing stipulation into March would reduce direct disturbance to booming activities. In the Carlsbad Resource Area, extending the timing stipulation into June would not be of much benefit to chicken populations in the current 162,822 acre habitat area, because many of the oil and gas leases there are completely developed, or are in the development stages.

Under Alternative D, applying timing restrictions only on about 701,000 acres of habitat in the Roswell District would potentially result in a decrease of prairie chicken habitat and populations, because less area would be protected. This alternative would add March to the current timing stipulation, and reduce direct disturbances during the establishment of booming grounds and booming activities which begin in March. In the Roswell Resource Area, habitat protected by the timing stipulation would decrease by about 693,660 acres, primarily on split-estate lands (private surface/federal minerals). The core habitat areas would remain protected. In the Carlsbad Resource Area, the acreage protected under this alternative would remain the same as Alternatives B and E.

In the Roswell Resource Area, the amount of habitat protected by the timing stipulation under Alternative D decreases in comparison with other alternatives. However, the duration of protection is increased to take in the beginning of the booming period (March). The duration of protection for the nesting period (April 1 through May 31) remains the same as Alternatives A and C. The magnitude of habitat protection is greatest under Alternatives B and E, and least under Alternatives A and C. Alternative D is a compromise, with habitat protection afforded for the early establishment and protection of booming grounds, but on much less habitat.

Concurrent with timing stipulations, areas of "no new drilling" would be established to protect significant prairie chicken leks found in undisturbed habitat. Under Alternatives B and E, a 200-meter offset would apply in the Roswell Resource Area and a 400-meter offset in the Carlsbad Resource Area.

The 400-meter offset is needed in the Carlsbad Resource Area because the majority of the habitat in the designated prairie chicken area already is impacted by oil and gas activities, either directly or indirectly. The "no new drilling" area around identified leks would greatly reduce overall disturbance to the leks and would potentially protect nesting habitat in the current 162,822-acre habitat. Under these alternatives, an additional 297,879 acres in the Carlsbad Resource Area would be subject to this stipulation. This would allow protection of habitat and curtail the destruction of leks by future development.

The "no new drilling areas" would protect crucial booming grounds needed for breeding, and would result in the continued viability of prairie chicken populations in the Roswell District. Under Alternative C, the restriction would not apply in either resource area and may result in the direct loss of or abandonment of leks and nesting habitat, contributing to a decline in prairie chicken populations throughout the Roswell District. Under Alternative D, prairie chicken leks would be protected throughout the Roswell District with a 200-meter offset. Benefits from implementing offsets include preserving significant booming grounds (leks) and nesting habitat for prairie chickens, and other game and nongame wildlife species habitat, from surface disturbing activities associated with oil and gas development.

Under Alternatives B, D and E, reducing noise from pump jack motors to a maximum of 75 decibels (db) will potentially support reestablishment of booming grounds around existing loud pump jacks. Females will be able to hear the booming males and potentially increase reproductive success (i.e. more poult groups) as a result of reducing noise levels.

Under Alternative C, allowing noise from pump jack motors to remain unmuffled (typically at levels of 95 db or greater), will continue to affect reproductive success, because females cannot hear booming males and subsequently do not arrive on the booming grounds for the annual courtship interactions. In addition, habitat within three-fourths of a mile of loud pump jack motors would remain unused, because booming by males is ineffective under noisy conditions.

Under Alternatives A, C, D, and E, site-specific habitat features, such as wildlife habitat projects, raptor nesting sites, and cave or karst features, would be protected from oil and gas development by a buffer of up to 200 meters. Long-term benefits would be the maintenance of wildlife distribution and abundance in areas served by these features. Under Alternative A, these features would only be protected as provided by existing regulations, on a case-by-case basis. Project effectiveness and feature desirability would be compromised by activities within 200 meters or closer, because habitat and human disturbances would causing wildlife to leave the area or avoid using these features.

Under Alternatives C, D and E, if the buffer for wildlife projects is waived, required off-site mitigation would result in no net loss of projects. The degree of benefits for wildlife would depend on the location and quality of the replacement project. Impacts could be positive or negative. Negative impacts would occur if a wildlife watering unit currently providing for local wildlife populations is replaced with another unit located in another area that may not be the best location. Wildlife abundance would decrease within the original project area. Alternative B, provides the most protection for habitat features with a 400-meter buffer and no allowance for off-site mitigation. It would result in long-term benefits for wildlife by the protection of these features and a greater surrounding habitat area.

Under Alternatives A and C, raptor nesting structures and an occasional inactive nesting site may be destroyed by activities related to oil and gas development. In some cases, even with the possible set-back of up to 200 meters, well sites could be positioned so close to nests that future viability of these sites for nesting is lost. Active nesting sites may be abandoned due to well pad, pipeline, or road construction, or associated traffic and human disturbances. A subsequent decrease in raptor populations could occur over the long term.

Under Alternative B, would provide the greatest protection for active and inactive raptor nesting sites from surface disturbing activities. Delaying activity for up to 90 days would minimize disturbance and human activities near active nests and allow a greater probability for completion of nesting activities. A 90-day period also would provide protection of habitat during the post-nesting period, so that the young birds could become acclimated to their surroundings and develop instinctive hunting and territorial traits. Nesting structures and active and inactive nests would be protected from destruction by restricting surface disturbance within up to 400 meters of structures or nests. Over the long term, the requirements proposed under this alternative would allow raptor populations to increase.

Under Alternatives D and E, nesting success would increase over the success expected under Alternatives A and C, as a result of delays in activity of up to 90 days that allow completion of nesting activities. Nesting structures and active and inactive nests would be protected for future use by restricting surface disturbance within up to 200 meters of the nest, essentially to the extent they are protected presently. Potentially, the 90-day delay period proposed under these alternatives would bring about an increase in the overall raptor populations.

Under Alternatives A, D, and E, the buffer from oil and gas development of up to 200 meters from floodplains and playa or alkali lakes would result in the protection of riparian and aquatic habitat for a variety of wildlife species dependent on these habitats for all or part of their life cycle. This restriction would preclude habitat and wildlife disturbance and preserve the resource value of these areas for wildlife needs such as nesting, fawning, feeding and resting. These areas are unique and critical for the survival and maintenance of wildlife populations and biodiversity. The magnitude of protection is greatest under Alternative B with the 400-meter buffer. Wildlife harassment and displacement would be further reduced and would include additional upland habitat protection for wildlife species dependent on habitat edges, which are the most diverse habitats due to the transition between vegetation types. Alternative C would provide the least amount of habitat protection, and would result in the long-term degradation and loss of riparian habitat and associated upland habitat. Improved public access into previously undisturbed habitat would increase wildlife harassment and displacement.

For springs and seeps, the magnitude of protection is greatest under Alternative B, due largely to the 400-meter buffer from all surface disturbing activities. This alternative would afford long-term benefits to riparian, aquatic and wildlife habitat, and would preserve and enhance these areas for continued wildlife diversity and abundance. Not only would the source be protected, but the portion of the watershed surrounding these sources would be preserved. The 400-meter buffer area would preclude surface disturbing activities, which could potentially affect the source. Alternatives D and E would provide the same buffer shape as Alternative B, but with a 200-meter buffer. Long-term benefits would be similar, but the degree of benefits would be less due to the smaller buffer area. Negative impacts are greatest under Alternative A, because these features would only be protected as provided by regulations on a case-by-case basis, in which the 200-meter buffer may be applied or be reduced. Impacts include sedimentation of springs or seeps, destruction of downstream riparian/wetland habitat, and wildlife displacement because of impaired habitat conditions or increased human activity from the developments. Alternative C would provide the long-term protection of these features with a 200-meter buffer, but would not protect downstream riparian habitat beyond the buffer.

OTHER MINERALS MANAGEMENT

In the Roswell Resource Area, the effects of mining minerals other than oil and gas, would be similar to the surface disturbing impacts produced by oil and gas development. Generally, wildlife habitat would be lost or degraded. These impacts could be considered long term, because habitat would not be replaced until mining ceases. Wildlife displacement would also occur because of the presence and activity of humans. These indirect impacts would be minor, short-term and confined to periods of exploration or mining activity.

It is estimated that fewer than 100 acres would be disturbed annually by activity related to the mining of locatable minerals. Disturbance would generally be limited to areas of less than five acres per operation, per year. Disturbance would be reclaimed when mining ceases. Overall, these impacts are considered to be minimal.

The mining of solid leasable minerals and salable minerals is discretionary. Management control would be exercised over the locations and methods of mining, and impacts to wildlife and wildlife habitat would be partially mitigated, as a result. Interest in exploring for solid leasable minerals remains low. An estimated one to ten exploration permits could be issued, per year. An estimated 200 acres would be disturbed over the next 20 years by the mining of salable minerals. The impacts associate with both solid leasable and salable mineral exploration and mining are considered to be minimal.

Further mitigation of impacts, especially those related to solid leasable and salable minerals, would result from the use of the Surface Use and Occupancy Requirements. Applicable guidelines would be applied to any authorization to conduct mining of these categories of minerals.

LANDS AND REALTY MANAGEMENT

Under Alternative A, about 62,986 acres in existing exclusion zones would protect wildlife habitat from major rights-of-way (ROW). Several of the protected areas are National Natural Landmarks and not necessarily significant wildlife habitat areas. Of the exclusion areas, the two WSAs, comprising about 25,321 acres, and the 6,617-acre Mescalero Sands Recreation Complex, provide more significant wildlife habitat. Long-term benefits on about 32,000 acres of wildlife habitat in these areas include the protection of a unique lava flow ecosystem with its distinctive flora and fauna, and the protection of a small area of Mescalero Sands which support important lesser prairie chicken and dunes sagebrush lizard habitat. Major ROWs, such as gas transportation pipelines and power transmission lines, would have greater impacts to other significant wildlife habitat areas under this alternative. Impacts include direct loss of habitat and displacement of wildlife in the construction area. Moderate long-term impacts, primarily wildlife displacement, would result due to an increase in human activity in maintaining ROWs, and from increased access to new areas previously inaccessible to the public. Possible benefits would be the use of certain types of facilities, such as raptor-safe power lines, for perching raptor species, and cleared corridors as prairie chicken booming grounds in Mescalero Sands.

Under Alternatives B, D, and E, ROW exclusion areas and avoidance areas would have positive, long-term effects on wildlife habitat within the core prairie chicken areas, Rio Bonito acquired lands, Mathers RNA, Wilderness Study Areas, and ACECs, by protecting wildlife habitat from surface disturbing activities and human activity associated with ROW maintenance. The abundance of wildlife in these areas would be preserved. Alternative B would provide the most protection for wildlife habitat excluding ROWs on about 335,573 acres and avoiding them on about 310,833 acres.

Under all alternatives, cumulative impacts of all land use authorizations in important wildlife habitat areas would result in habitat fragmentation and decreased wildlife habitat use due to increased human activity associated with facility maintenance.

Under Alternatives B and E, the acquisition of private and state lands resource area-wide would result in long-term benefits to wildlife and habitat. Benefits include improved manageability of wildlife and riparian-wetland resources and potential for increasing wildlife abundance and distribution through habitat protection and enhancement.

Under Alternative C, acquisition would be deemphasized. Public lands would remain intermingled with state and private lands, and the potential for wildlife habitat protection, enhancement and manageability would be reduced. State and private land-use activities could potentially impair BLM wildlife habitat management efforts, particularly in riparian-wetland areas and big game/upland game habitat on adjacent public lands.

Under all alternatives, the disposal of between 3,155 and 150,000 acres of public land would not have a major impact on wildlife or habitat, because lands supporting important big game habitat, riparian-wetland areas, and critical T/E habitat would be evaluated for retention in public ownership.

LIVESTOCK GRAZING MANAGEMENT

Under Alternative A, livestock grazing, where not properly managed, would impact wildlife habitat by potential over-utilization of vegetation that provides forage, browse and cover. Other impacts are degraded riparian-wetland areas, impairment of the proper functioning condition, and degraded habitat conditions for T/E plant and animal species. These important habitats would deteriorate or remain at less than potential if interdisciplinary Allotment Management Plans (AMP) are not implemented. Grazing treatments prescribed in current interdisciplinary AMPs would have long-term benefits to wildlife habitat such as riparian areas, playas, T/E species habitat, and big game/upland game habitat. Benefits include habitat diversity, availability of forage and cover, and increases in wildlife species diversity and abundance. Older AMPs with the emphasis on forage production for livestock may not reflect prevailing wildlife habitat management concerns. Implementation of these plans would produce a gradual decline in wildlife and habitat diversity over the long-term.

Under Alternatives B and E, interdisciplinary AMPs developed to achieve DPC and emphasize meeting wildlife habitat and watershed management goals and objectives would be developed for grazing allotments within the Caprock Wildlife Habitat Area (WHA). This would result in long-term benefits to wildlife populations and habitat conditions. Benefits include wildlife and plant species diversity, increased wildlife species distribution and abundance, and protection of essential habitats for T/E species.

Under Alternative C, the emphasis on livestock production would result in potential negative long-term impacts to wildlife and habitat depending on the vegetative community type and kind or class of livestock. For example, grass production for cattle in the shinnery oak-dune community type may negatively impact lesser prairie chicken and dunes sagebrush lizard habitat. Negative impacts include a decrease in wildlife and plant species diversity, decreased wildlife species distribution and abundance, and limited protection of essential habitats for T/E species.

Under Alternative D, emphasis on watershed, wildlife habitat management, and livestock production would result in long-term benefits to wildlife and habitat. Benefits are the same as those for Alternatives A and B.

Under all alternatives, range improvement projects designed with consideration for wildlife,, such as livestock water developments, erosion control structures, reseedings, prescribed fires, vegetative sales, and riparian pasture fences, would generally enhance the quality of wildlife habitat. Vegetative condition, forage production, and habitat diversity would improve, and wildlife species distribution and abundance would increase.

The construction of livestock waters in previously unwatered areas would promote increased wildlife distribution and abundance, but may potentially increase grazing pressure in those same areas. Short-term impacts of range improvement projects would be the temporary displacement of wildlife during construction activities. Improved public access as a result of pipeline and storage tank construction and maintenance activities would increase opportunities for wildlife harassment and displacement over the long term.

VEGETATION MANAGEMENT

Under Alternative A, increasing vegetative composition and production to attain potential plant communities described in the SCS Range Site Guides would result in benefits to wildlife habitat in most vegetative community types. In some areas, achieving vegetative potential or late seral stage may not be the goal for wildlife habitat management. Wildlife abundance and diversity can be enhanced by manipulating plant communities to reach an early- or mid-seral stage. In some areas, potential can no longer be achieved due to changes in soil structure affecting plant composition, long-term climatic changes that have occurred, and disclimax plant communities that dominate several range sites.

In general, manipulating vegetative composition using treatments such as prescribed fire, biological controls, chemical, mechanical or grazing treatments, or range improvements, would have long-term benefits for wildlife and habitat, if projects are designed with consideration given to wildlife concerns.

Decreasing the density of invading plant species, such as cholla and mesquite, by mechanical removal would have minimal impacts to wildlife and habitat compared to the alternative of leaving the entire plant community untreated. Actual clearing activities would result in temporary displacement of wildlife and some loss of nesting and cover for wildlife species. This direct impact would be localized to the control area, with a minor shift in wildlife species from those that favor brushy areas to those that prefer a more grassy, open habitat type.

Decreasing the density of creosote, mesquite, snakeweed, and noxious weeds by chemical treatment would have short-term impacts to wildlife resulting from the decrease of food and cover for wildlife species within the control area. Conversely, vegetation such as grasses and forbs would increase and improve wildlife habitat. The direct impacts would be the same as mechanical removal. Long-term benefits, such as enhancing habitat diversity by creating vegetative mosaics, edge, and forage production, result when wildlife concerns are considered in the design of a treatment. However, impacts may be negative if treatments are not designed with wildlife considerations, and if proper grazing management (other than periods of rest following treatment), is not implemented to preserve the results of the treatment.

Decreasing the density of the ubiquitous salt cedar with either mechanical (cutting) or chemical control would produce long-term benefits to the natural plant community, particularly riparian-wetland areas, because native vegetation would be able to re-establish itself without competition from salt cedar. Wildlife species diversity would increase in control areas with the removal of monotypic stands of salt cedar that dominate many sites. Native vegetation (either planted or allowed to return naturally) would provide vegetative structural diversity that wildlife prefer. Salt cedar control may have negative impacts to wildlife habitat if indiscriminately removed from areas where follow-up reseeding or plantings are not conducted, or the potential for natural re-establishment of native vegetation is low, or where salt cedar is the only vegetation contributing to stream bank stability. Removal of vegetative cover without considering these factors may leave areas barren and unproductive.

Under Alternatives B and D, long-term benefits to wildlife and habitat would result from vegetative manipulation projects and 40 to 45 percent utilization levels designed to meet interdisciplinary goals and objectives set by watershed, range and wildlife management programs for each vegetative community type. Vegetation resource condition objectives would be prescribed to meet desired plant community objectives. Impacts from vegetative treatments to wildlife and habitat would be the same as Alternative A, except chemical control methods would not be used.

Under Alternatives C and E, vegetation resource condition objectives) would be prescribed and chemical control methods would be used to achieve desired plant communities. The major difference would be the length of time between treatments of adjacent pastures and re-treatments. Alternative E would have greater benefits for wildlife and habitat than Alternative C.

RECREATION FACILITY MAINTENANCE

Impacts of recreation facility maintenance and expansion at existing recreation sites would be minimal. A total of about 20 acres of wildlife habitat would be lost at the Valley of Fires Recreation Area, Mescalero Sands North OHV Area, and Fort Stanton Area (Rio Bonito and Ft. Stanton Cave Campground), under Alternative A. Increasing visitation over time at the improved recreation sites would result in increased wildlife harassment and displacement. Visitors would disperse from these sites to undisturbed wildlife habitat to pursue various recreational activities.

Impacts of recreation facility maintenance and expansion, and land acquisitions at the Valley of Fires Recreation Area, and Mescalero Sands North Dune and Haystack Mountain OHV areas under Alternatives B, C, D, and E, would be minimal, as well. If impacts occur, they would be in the form of habitat loss and short-term displacement due to construction and increased human activity, until wildlife became habituated to the activity and improvements. Under Alternatives C, D, and E, the designated OHV areas would be expanded, resulting in a direct loss of wildlife habitat to trail development, and a broader area of wildlife disturbance due to motorized activity encroaching upon undisturbed wildlife habitat. Long-term negative impacts include decreased wildlife use and habitat degradation within the area.
Low intensity recreational use at the Rio Bonito acquired lands (Tracts 1-4) would result in moderate wildlife disturbance because the lands were previously closed to the general public. Developed access and parking would promote increased public use of the area, resulting in a corresponding increase in wildlife harassment, unless recreational management reflects the needs of wildlife.

There would be minimal impacts to wildlife and habitat from the development of the Billy the Kid Recreation Site and Garnsey Bison Kill Site. If impacts occurred they would be tied to habitat loss and wildlife displacement. These impacts also would be expected from intensive recreational development on the Rio Bonito acquired lands (Tract 5). Damage to the riparian area along the Rio Bonito would occur from human activity resulting in potential bank erosion, destruction of riparian vegetation, and increased siltation.

CAVE MANAGEMENT

The visitation of caves under Alternatives A and C, would displace wildlife species that use caves for shelter, nesting, hibernating and foraging. Recreational use of caves would cause a decrease of wildlife use of caves. Managing the caves under the current permit system and limiting cave visitation would mitigate some adverse impacts to this unique wildlife habitat feature. Direct loss of bats or abandonment of cave habitats would occur from uncontrolled or excessive visitation of nine caves identified as significant summer roosts or hibernacula, or in caves unsurveyed for bats. Protecting these caves by controlling surface use within a 200-meter offset, may adequately protect them, on a case-by-case basis.

Under Alternative B, visitor use limits, seasons of use and a permit system, in conjunction with the 400-meter no surface occupancy restriction around all caves, would result in long-term benefits to wildlife. Long-term benefits include preserving significant cave summer roosts and winter hibernacula for various bat species, protecting biota that live only in cave ecosystems, and preserving habitat diversity for a variety of wildlife that use the caves and surrounding habitat. Under Alternatives D and E, long-term benefits to wildlife are similar to Alternative B, but to a lesser extent, because the no surface occupancy restriction would not exceed 200 meters.

OFF-HIGHWAY VEHICLE USE

Under Alternative A, off-highway vehicle (OHV) closures on the Mathers RNA and the two WSAs would have long-term benefits for wildlife by protecting wildlife habitat from vehicle damage and reducing wildlife harassment from OHV use. Wildlife abundance in these areas would remain the same. Limiting OHV use to designated roads and trails at the Mescalero Sands North Dune OHV Area and in the west portion of Fort Stanton would protect wildlife habitat from undue degradation. Noise disturbance from intense motorized activities would continue to displace wildlife species in the OHV area.

At Fort Stanton, the designation would protect critical cactus habitat, big game/upland game habitat and riparian habitat from undue habitat and wildlife disturbance. Critical cactus habitat would be preserved, wildlife distribution and abundance would be maintained, and biodiversity would be preserved.

Limiting OHV use to existing roads and trails in the Haystack Mountain OHV Area and Mescalero Sands Recreation Complex, would affect about 26,041 acres of wildlife habitat. Long-term negative impacts resulting from this designation include degraded wildlife habitat from OHV use on new trails created by vehicular travel during geophysical exploration, pipeline or fence construction, and other OHV travel. Habitat fragmentation, increased wildlife harassment and displacement, and decreased wildlife abundance in areas that were relatively undisturbed, would result.

The OHV open designation on over 400,000 acres of public land in the east portion of the resource area would result in significant negative impacts to important wildlife habitat areas. Unrestricted off-highway driving, repeated use of trails created by OHVs, and undue surface damage from careless vehicle operation, would mar riparian-wetland areas, cause a direct loss of T/E species habitat, displace big game/upland game, contribute to poaching, and destroy unique plant communities.

Under Alternative B, intensive motorized recreational use at the North Dune and Haystack Mountain designated OHV areas would cause short-term impacts to a variety of wildlife species when OHV activities are occurring. The magnitude of wildlife harassment from noise and human activity would be greater at the Haystack Mountain OHV area than the developed North Dune OHV area, because the Haystack Mountain location is relatively undisturbed at this time, and has no recreational facilities to attract intensive use to the area. Proposed facilities at the Haystack Mountain OHV area, such as rest rooms, sun shelters, picnic areas, trails and interpretive displays, would promote increased public use of the area. This would result in a corresponding increase in wildlife harassment and a decrease in wildlife abundance.

Under Alternative B, closing the Valley of Fires Recreation Area to OHV use would have long-term benefits for wildlife by protecting about 400 acres of wildlife habitat from vehicle damage and reduce wildlife harassment. Wildlife species accustomed to human activity would remain in the area.

Under Alternatives B, C, D, and E, closing the entire Mathers RNA, the two WSAs, the Garnsey Bison Kill Site, the Border Hills Structural Zone National NNL, and any cave exclosures to OHV use, would have long-term benefits to about 33,832 acres of wildlife habitat. Benefits include protecting habitat, maintaining wildlife abundance and distribution, and preserving habitat diversity. Limited OHV use to designated roads and trails on acquired lands adjacent to the WSAs, the Valley of Fires Recreation Area, acquired lands along the Rio Bonito, and lands surrounding the Garnsey Bison Kill Site would protect about 12,000 acres of wildlife habitat from undue degradation. The designation would protect big game/upland game and non-game habitat in the WSAs and significant riparian habitat along the Rio Bonito, and preserve wildlife diversity and abundance.

All-terrain vehicles would be limited to roads within the Haystack Mountain OHV area, which would confine wildlife habitat disturbance and wildlife harassment. However, in Alternatives C and D, the expansion of the OHV area by acquisition, and the resulting OHV use on the acquired lands, would cause long-term negative impacts. These impacts include increased habitat degradation in previously undisturbed areas, a potential increase in sedimentation of the Pecos River, and an overall decrease in wildlife diversity because of wildlife harassment and displacement. Opening the existing Mescalero Sands North Dune Recreation Area to OHV use would cause continued wildlife harassment and displacement. However, under Alternatives C, D and E, the magnitude of negative impacts increases about three-fold due to the expansion of OHV use into previously undisturbed areas. Negative impacts include a decrease in wildlife utilization of the area during periods of high OHV use, destruction of dune-stabilizing vegetation, and damage to the few cottonwood trees in the OHV area.

Under Alternatives C, D and E, impacts to wildlife habitat would be insignificant from all-terrain vehicle use at the 640-acre Dunahoo Hills, because the area has been degraded from past OHV use and wildlife values are low. Limiting OHV use to designated roads and trails in all floodplains and riparian-wetland habitat areas along the Pecos River would allow continued vehicular use in these areas, with no additional habitat disturbance. Undesignated roads and trails would be closed to vehicle use and important wildlife and plant habitat would be protected by a decrease in habitat disturbance and wildlife harassment throughout the year. Under Alternative B, closing about 19,200 acres of floodplains and riparian-wetland habitat areas along the Pecos River to OHV use would result in substantial long-term benefits to these areas and wildlife species dependent on this sensitive plant community.

About 16,400 acres of ephemeral wetland habitat, which includes playas, alkali lakes and surrounding areas, would be protected under Alternative B, producing long-term benefits for a variety of water-dependent wildlife species. Under Alternatives C and E, about 2,000 acres of habitat would be minimally protected, because only the playa and alkali lake bodies would be protected from OHV use. Under Alternative D, about 7,400 acres of habitat, including playas, alkali lakes and small buffer areas, would be protected from OHV use.

About 760 acres of spring/seep sources and downstream riparian areas would be protected from OHV use under Alternative D, producing long-term benefits for a variety of water-dependent wildlife species. Under Alternatives B and E, about 950 acres of spring/seep sources and downstream riparian areas would be substantially protected. And, under Alternative C, about 240 acres of spring/seep sources would be protected from OHV use.

Under Alternatives B, C, D, and E, limiting OHV use to designated roads and trails on all open public lands not otherwise classified would produce long-term benefits to wildlife and habitat. Wildlife and plant habitat degradation and wildlife harassment would continue, but to a much lesser degree than if the areas were open to OHV use. Road densities and access into important habitat would remain the same or decrease. Undesignated roads and trails would be closed, helping to protect important wildlife and plant habitat from disturbance.

The roadrunner is the New Mexico State Bird.

WILDLIFE HABITAT MANAGEMENT

Under all alternatives, habitat management activities would produce long-term benefits. Biological diversity in the resource area would be enhance by the protection of T/E animal and plant species and habitat. The condition of plant communities would be improved. The big game/upland game and waterfowl populations would increase, as would the distribution of these species throughout the resource area.

WATERSHED MANAGEMENT

Under all alternatives, there would be long-term benefits to wildlife habitat from the management of soils and surface watersheds. Construction of watershed projects would cause temporary displacement of wildlife, however, wildlife would return within a short time period. There would be long-term benefits to wildlife habitat from watershed projects. Benefits include the enhanced vegetative condition in watersheds, increased surface water availability, improved condition of riparian-wetland areas, and greater wildlife abundance across several plant communities.

FIRE MANAGEMENT

Under all alternatives, large wildfires would cause temporary impacts to wildlife habitat from the direct loss of vegetation which provides food and cover. In most cases, wildfires have long-term benefits to wildlife and habitat and are part of the natural ecological functions of many areas. Nutrients tied up in plant biomass are returned to the soil, forb production typically increases, grasses and some shrub species are invigorated. Habitat becomes more diverse, and vegetative mosaic and edge that is created contribute to species diversity. A shift would occur in wildlife species that prefer an early vegetation seral stage. Fire suppression activities would cause minimal impacts to wildlife habitat. Wildfires and suppression activities would temporarily displace wildlife species near the fires. There would be no significant loss of wildlife or habitat. Threatened or endangered plant species may be lost where wildfires occur in occupied habitat and when full suppression activities are conducted. Prescribed fires would similarly affect about 2,000 to 6,000 acres annually in grassland, riparian, and pinon-juniper vegetative communities. Prescribed fires would have a long-term beneficial impact on habitat similar to that produced by wildfires.

IMPACTS OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN

OVERFLOW WETLANDS ACEC

Minerals Management

The combination of oil and gas leasing closures and no surface occupancy stipulations would protect wetland habitat and wildlife populations in the Overflow Wetlands ACEC to varying degrees, under each alternative. Under Alternatives B and D, oil and gas activity would be precluded. Limited natural wetland habitat in the Pecos Valley would be protected, wintering waterfowl populations would be maintained, and aquatic habitat for native fish species, including the Pecos pupfish, would be protected.

An existing no surface occupancy restriction would protect about 700 acres of wetland habitat and about 170 acres of buffer around the wetlands, under Alternative A. The remainder of the area would be subject to development. Direct impacts include the loss of wildlife habitat from development facilities, impaired water quality from potential sedimentation or pollution of wetland habitat, decline in waterfowl populations, and loss of Pecos pupfish found in the wetlands and channels. Other sensitive habitat areas, such as the gypsum escarpment with its unique assemblage of gypsiferous plant species, would be open to development.

Under Alternatives C and E, about 1,040 acres would be open to future oil and gas leasing with no surface occupancy, giving protection to the 700 acres of wetland, the 170-acre buffer around the wetlands, and 170 acres of escarpment. The remainder of public lands in the ACEC would be open to future leasing subject to other surface use restrictions. Benefits are the same as Alternative B for those lands where no surface occupancy is applied. Negative impacts are the same as Alternative A for the remainder of the ACEC.

The effects of mining salable and solid leasable minerals would be minimal. If mining did occur, temporary declines in air and water quality, temporary wildlife displacement and harassment, and the loss of habitat due to surface disturbance would be expected. Approvals for mining salable and solid leasable minerals are discretionary; mining would not be allowed where impacts would affect valuable resources. Closures of varying acreages in the ACEC under Alternatives B, C, D and E, would afford additional protection of riparian/wetland and wildlife habitat.

Lands and Realty Management

Under Alternative A, rights-of-way would be authorized in the WHA, resulting in negative impacts to the riparian/wetland ecosystem. Negative impacts include riparian/wetland habitat loss from construction in the right-of-way, potential sedimentation of the wetlands and Pecos River from construction activities, displacement of waterfowl during critical seasons of use, waterfowl harassment because of improved access through the WHA, and disturbance during the maintenance of the ROWs.

Under Alternatives B, D and E, the exclusion of major rights-of-way on about 3,000 acres of public land would result in long-term benefits. Benefits include the protection of riparian/wetland and wildlife habitat from major surface disturbing activities and human activities associated with maintaining ROW facilities. This would result in the protection of important waterfowl roosting areas and limit the possibility of harassment and displacement of wildlife that are dependent on the area.

Under Alternative C, about 700 acres would be excluded and 2,300 acres would be avoided from major rights-of-way, resulting in a combination of long-term benefits and potential long-term negative impacts to riparian/wetland and wildlife habitat. Long-term benefits of exclusion include the protection of wetland and aquatic habitat and some nesting habitat for waterfowl. If rights-of-way were allowed through the ACEC in the event no routes around the ACEC were available, the impacts would be the same as those described for Alternative A.

Under Alternatives B, D and E, the acquisition of 1,700 acres of state land and 2,100 acres of private land in the Overflow Wetlands ACEC would have major long-term benefits for numerous wildlife species dependent on riparian/wetland habitat for either all or part of their life cycle. Benefits include protecting riparian/wetland and aquatic habitat for wintering waterfowl, the Pecos pupfish, and numerous game and nongame wildlife species inhabiting the ACEC. Acquisitions would improve the manageability of the ACEC, enhance protection of riparian/wetland habitat, and allow for improving wildlife habitat through various projects. The result would be an increase in the abundance and distribution of numerous wildlife species. In addition, a portion of the lands overlooking the wetlands would be developed for the Watchable Wildlife program.

Under Alternatives A and C, the acquisition of 960 acres of private land supporting wetland habitat and lands overlooking the wetlands would have benefits similar to those described for Alternatives B, D and E. However, the magnitude of benefits is less under Alternatives A and C, because the amount of acreage acquired is smaller. Potential negative impacts could occur to the Overflow Wetlands state and private lands located in and adjacent to the ACEC were developed. Possible uses of the state and private lands could include mining, subdivision development, and off-highway vehicle use.

Under Alternatives B, C, D, and E, the acquisition of legal access to the Overflow Wetlands would resolve conflicts between private landowners and public land users, allow for the construction of wildlife habitat improvement projects, and provide legal public access to specific areas of public lands. The use of OHVs would be limited to designated roads and trails to reduce the potential for wildlife harassment.

Under Alternative C, acquisition of legal access would not occur. Habitat management and the construction of wildlife habitat improvement projects would be impaired. Lack of legal access would protect the ACEC from potential impacts associated with various types of recreational use, if access is denied to the public across private lands adjacent to the ACEC.

Livestock Grazing Management

Under Alternative A, livestock grazing would continue on all public lands in the WHA, with current allocations based on upland monitoring data. In the long-term, overgrazed riparian vegetation, unstable streambanks, stream sedimentation, invasion of undesirable plants, lowered water tables, loss of wildlife cover and forage, and reduced wildlife diversity, abundance and distribution would occur throughout the WHA.

Under Alternatives B, C, D and E, public grazing leases or permits affecting about 3,000 acres of public land would be adjusted to improve habitat, primarily for wintering waterfowl. Long-term benefits would occur from all of these alternatives. However, the difference between the seasons of rest would change the magnitude of the positive impact. The longer the rest period from livestock grazing, the greater the chance for improving wildlife and riparian habitat.

Vegetation Management

Under Alternative B, salt cedar control by prescribed fire and mechanical methods would cause temporary impacts to wildlife habitat from the direct loss of vegetation that provides food and cover, and from minor surface disturbances, depending upon the vegetative control technique being used. In most cases, fires have long-term benefits to wildlife habitat and are part of the ecological functions of many areas. Reducing salt cedar concentrations by prescribed fire, or mechanically, allows for native plants to regenerate, and improves water quality and water table levels.

Under Alternatives C, D and E, the impacts of salt cedar control generally would be the same as Alternative B. However, under these alternatives, chemical treatment could be used. Smaller areas are treated when applying a chemical by hand as compared to aerial application, where the plant community would be changed on a larger scale. The magnitude of impacts between Alternatives C, D, and E would be dependent on the method of treatment. All alternatives have long-term benefits from reducing salt cedar stands, allowing for native plants to regenerate, and improving water quality and water table levels.

Recreation Management

Under Alternative A, the Overflow Wetlands would be prone to indiscriminate recreational use, causing long-term negative impacts to wildlife habitat and harassment of numerous wildlife species inhabiting the WHA.

Under Alternatives B, C, D and E, the Overflow Wetlands would partially develop as a Watchable Wildlife area by constructing nature trails, and upgrading and signing existing access routes. The public would be directed to areas where visitation would cause minimal disturbance to wildlife and habitat. Actual construction activities could cause temporary short-term displacement of local wildlife and seasonal waterfowl populations, but would be conducted during a period when wildlife would be least affected.

Construction of Watchable Wildlife facilities to further direct the public through the WHA, such as an observation overlook, rest rooms, picnic tables and parking areas, is dependent on acquisition of the private lands adjacent to State Road 42. If the lands are acquired, there would be a loss of about two acres of grassland habitat for the facilities mentioned above. Wildlife species would be temporarily displaced from the area but would return after construction ceased.

Long-term benefits would be increased public awareness of riparian/wetland habitat and management through environmental education, viewing opportunities of waterfowl and shorebirds that are non-disruptive to the birds, and protection of the wetlands from indiscriminate travel throughout the WHA.

Under Alternative A, about 2,987 acres of public land in the ACEC would remain open to OHV use, resulting in potential resource damage to riparian/wetland areas, as vehicles attempt to traverse boggy areas. Harassment of roosting waterfowl at isolated ponds, and the creation of new roads and trails to undisturbed areas in the WHA could also occur.

Under Alternatives B and D, the OHV closure would result in the direct protection of about 700 acres of riparian/wetland habitat. The use of OHVs would not be allowed on specific roads that lead to the wetlands, to avoid damage to riparian/wetland areas and harassment of waterfowl on isolated ponds. Impacts from OHV use would be minimized on about 2,300 acres of the remaining public lands in the ACEC by limiting travel to designated roads and trails, to reduce unnecessary resource damage and harassment of waterfowl and wildlife.

Under Alternative C, about 700 acres of wetlands would be also be protected from indiscriminate OHV use by limiting travel to designated roads and trails.

Boggy conditions limit travel through the wetland area, but off-road vehicles could attempt access from designated roads that lead to the wetlands, causing potential resource damage and harassment of waterfowl. About 2,300 acres of public lands would be protected from indiscriminate OHV use by limiting travel to designated roads and trails. Wildlife harassment still would occur as OHVs traverse the ACEC on roads and trails already in place. The magnitude of OHV impacts under this alternative would be less than Alternative A.

Under Alternative E, OHV impacts would be the same as Alternative B, except that an additional 170 acres of escarpment overlooking the wetlands would be protected. This action is dependent upon the acquisition of the private lands adjacent to State Road 42. Benefits include preserving fragile wildlife habitat on the escarpment and the limiting waterfowl harassment on several ponds below the escarpment.

Under Alternative A, public lands in the WHA would be open to public fishing and minnow seining. Long-term impacts of open public fishing in the WHA would be the decline in riparian habitat conditions resulting from littering, camping, OHV use in and along the river, shooting, vandalism of range and wildlife improvements, unauthorized removal of vegetation, and harassment of wildlife. Long-term negative impacts of open minnow seining would be a decline of Pecos pupfish populations because of accidental taking.

Under Alternatives B, C, D and E, development of controlled public fishing opportunities would cause only minor impacts to wildlife and habitat. Potential impacts associated with recreational use mentioned above could be reduced with appropriate signing, designations and public education. Long-term benefits would be the isolation of adverse recreational impacts to the developed sites. Closing the WHA to minnow seining would benefit to the Pecos pupfish over the long term by eliminating any accidental taking of the pupfish.

Wildlife Habitat Management

Habitat improvement projects identified in the habitat management plan developed for the area would be constructed under Alternative A. These projects are intended to protect and enhance the WHA for all wildlife species, but alone would not be sufficient to protect wildlife habitat in the long term, because other land use restrictions and resource allocations are needed. The habitat improvement projects would be implemented to benefit wildlife and riparian/wetland habitat, particularly waterfowl and T/E fish.

Under Alternatives B, D and E, the development of 300 acres of additional wetland habitat would have long-term benefits to waterfowl, shorebirds, and aquatic plant and animal species. Benefits would be additional open water for waterfowl use, increased waterfowl and shorebirds, increased riparian/wetland habitat, and enhanced biological diversity of the area. Short-term impacts include surface disturbance and wildlife displacement during the construction of berms and dikes, and the modification of channels. The acquisition of water rights would have long-term positive impacts, resulting in the expansion and enhancement of riparian/wetland and waterfowl habitat.

Fire Management

Under all alternatives, wildfires and suppression activities would temporarily displace wildlife species. There would not be significant loss of wildlife and habitat. To eliminate riparian/wetland habitat disturbances, heavy equipment would not be used to construct fire lines. To protect aquatic habitat for the Pecos pupfish, retardant would not be used to suppress fires unless extreme circumstances dictate its use.

NORTH PECOS RIVER ACEC

Oil and Gas Management

Under Alternative A, about 1,920 acres would be open to future oil and gas leasing with surface use restrictions, resulting in the protection of riparian/wetland habitat in the floodplain of the Pecos River. The remaining area would continue to be open to leasing without surface use restrictions. Drilling and regular maintenance of production facilities would have long-term negative impacts to wildlife habitat in the area. Direct impacts include the loss of wildlife habitat from the development of facilities, impaired water quality from potential sedimentation or pollution of riverine habitat, declines in wildlife populations, and the potential loss of Pecos bluntnose shiner from the Pecos River. Other habitat areas, such as the major drainages, would be open to development. The magnitude of negative impacts to wildlife and habitat is greater under Alternative A than under Alternatives B, C, D and E, because the remainder of the North Pecos River ACEC would still be open to oil and gas leasing and related activities.

Under Alternatives B, D, and E, there would be no negative impacts to wildlife and habitat from oil and gas activities in the ACEC because of leasing closures and no surface occupancy restrictions. The long-term benefits would be the protection of limited riparian/wetland habitat in the Pecos Valley and the protection of aquatic habitat for native fish species, including the Pecos bluntnose shiner. Under Alternative C, about 4,200 acres would be open to future leasing with no surface occupancy. The North Pecos River ACEC would be protected and long-term benefits to riparian/wetlands and wildlife habitat similar to Alternatives B, D and E would result.

Other Minerals Management

Under Alternative A, about 4,200 acres of federal mineral estate would be open to the mining of saleable and solid leasable minerals activities. If mining occurred, long-term negative impacts to riparian/wetland and wildlife habitat would result. Because mineral material disposal is discretionary and would be limited to areas where impacts would be minimal, negative impacts to wildlife would be negligible.

Under Alternatives B and E, about 4,200 acres in the North Pecos River ACEC would be protected by closure from salable and solid leasable mineral mining. Long-term benefits to riparian/wetland and wildlife habitat would result, including protecting riparian/wetland and wildlife habitat for a variety of wildlife species, primarily the Pecos bluntnose shiner and mule deer. Important Pecos River riparian habitat and associated uplands would be protected, and water quality of the Pecos River would remain unchanged by mining. Harassment and displacement of wildlife species from mining would be avoided.

Under Alternative C, only about 1,520 acres would be protected from the disposal of salable minerals and about 4,200 acres protected from solid leasable mineral extraction. Benefits to riparian/wetland and wildlife habitat would generally be the same as those described above, but the magnitude of protection would be less than under Alternatives B and D. Negative impacts would be the same as Alternative A. The impacts of Alternative D would be the same as Alternative C, except that Alternative D would protect an additional 240 acres from the disposal of salable minerals.

Lands and Realty Management

Under Alternatives B and D, the exclusion of major rights-of-way on about 3,360 acres of public land would produce long-term benefits. Benefits include protecting riparian/wetland and wildlife habitat from surface disturbing activities and human activities associated with maintaining ROW facilities. Riparian areas, relic cottonwood groves, and aquatic habitat for the Pecos bluntnose shiner and other native fish would be protected. Harassment and displacement of wildlife species that are dependent on the relatively undisturbed habitat conditions at the ACEC would be limited.

Under Alternatives C and E, locating major rights-of-way would be avoided on about 3,360 acres. The positive impacts of avoidance would be the same as Alternative B. A potential negative impact would be the possibility of rights-of-way being allowed in the ACEC in the event no other routes around the ACEC were available. Other impacts include riparian habitat loss from construction in the right-of-way, loss of relic cottonwood tree groves, potential sedimentation of the Pecos River from construction activities, displacement and harassment of wildlife species from improved access in the ACEC, and human activity during the maintenance of the ROWs.

Under Alternatives B, D and E, the acquisition of 1,160 acres of state land and 1,880 acres of private land in the ACEC would have major long-term benefits for the riverine riparian area and the numerous wildlife species that use riparian, aquatic, and upland habitats found in the ACEC, for either all or part of their life cycle. Benefits include protecting aquatic habitat for the Pecos bluntnose shiner and other native fish species, upland habitat for mule deer and upland game birds, and riparian habitat for numerous game and nongame wildlife species. Acquisitions would improve the manageability of the ACEC, enhance protection of riparian/wetland habitat, and allow for the improvement of wildlife habitat through various range and wildlife projects. An increase in the abundance and distribution of numerous wildlife species associated with the Pecos River and adjacent upland habitat would result.

Under Alternatives A and C, potential negative impacts could occur to the North Pecos River ACEC from the surface or subsurface development of state and private lands located in and adjacent to the ACEC. Potential impacts could include the mining of saleable, locatable and leasable minerals off-highway vehicle use, grazing practices incompatible with riparian area rehabilitation, vegetative manipulation projects, and other unforeseen activities affecting the quality of riparian, aquatic and wildlife habitat in the ACEC.

Under Alternatives B, C, D, and E, the acquisition of legal access to the ACEC would resolve conflicts between private landowners and public land users, allow for the construction of wildlife habitat improvement projects, and provide the public with legal access to public lands. The use of OHVs would be limited to designated roads and trails to reduce the potential for wildlife harassment.

Livestock Grazing Management

Under Alternative A, livestock grazing would continue on all public lands in the North Pecos River ACEC, with current allocations based on upland monitoring data. Long-term negative impacts to riparian/wetland and wildlife habitat would result, such as overgrazed riparian vegetation, unstable streambanks, stream sedimentation, invasion of undesirable plants, decrease in water table, loss of wildlife cover and forage, and reduced wildlife diversity, abundance and distribution throughout the ACEC.

Under Alternatives B, D, and E, public grazing leases or permits affecting about 3,360 acres of public land would be adjusted to improve riparian and upland habitat in the ACEC. Long-term benefits would occur from all alternatives. Adjusting the seasons of rest and stocking rates would change the magnitude of benefits. The longer the rest period from livestock grazing coupled with an adjustment in stocking rates for pastures supporting riparian habitat, the greater the chance for improving riparian habitat in a shorter period of time, resulting in greater wildlife diversity, abundance and distribution throughout the ACEC.

Under Alternative C, the emphasis would remain on livestock production, resulting in static riparian habitat condition or potential decline in riparian condition over the long term, direct loss of riparian habitat, and a corresponding decrease in wildlife diversity, abundance and distribution throughout the ACEC.

Vegetation Management

Under Alternative B, salt cedar control on about 600 acres by prescribed fire and mechanical methods would cause temporary impacts to wildlife habitat from the direct loss of vegetation in treatment areas, and minor surface disturbance from fire fighting equipment and vehicles. In most cases, fires have long-term benefits to wildlife habitat and are part of the ecological functions of many areas. Reducing salt cedar concentrations by prescribed fire, or mechanically, allows for native plants to regenerate, improves water quality and water table levels.

Under Alternatives C, D, and E the impacts of salt cedar control generally would be the same as Alternative B. However, under these alternatives, chemical treatment could be used. Under Alternative E, smaller areas would be treated because chemicals would be applied by hand. Aerial application may be conducted under Alternatives C and D; larger areas would be treated. The magnitude of impacts between Alternatives C, D and E would be dependent on the method of treatment. All alternatives would have long-term benefits, resulting in the reduction of salt cedar stands, allowing for native plants to regenerate, and improving water quality and water table levels.

Recreation Management

Under Alternative A, about 1,920 acres of public land would be protected from off-highway vehicle (OHV) use by limiting all vehicle use to designated roads and trails, specifically within the floodplain of the Pecos River. Long-term benefits would be the protection of riparian habitat, and the maintenance of wildlife abundance and distribution within the ACEC. The remaining 1,440 acres of public land, primarily upland wildlife habitat and major draws, would continue to be open to OHV use, resulting in the potential loss of vegetation found on fragile soils, slopes, and draw bottoms, and harassment of wildlife species.

Under Alternative B, the OHV closure would result in the full protection of about 3,360 acres of public land in the North Pecos River ACEC from unnecessary resource damage and wildlife harassment caused by OHV use. Long-term benefits would be the conservation of riparian/wetland habitat and the protection of fragile upland wildlife habitat, resulting in the increase of wildlife diversity and abundance throughout the ACEC.

Under Alternatives C, D, and E, about 3,360 acres of public land in the ACEC would be protected from OHV use by limiting travel to designated roads and trails. The long-term benefits to wildlife and habitat are the same as Alternative A, but would include benefits to upland wildlife habitat as well.

Under Alternative A, long-term negative impacts of open minnow seining in the North Pecos River ACEC would be the decline of Pecos bluntnose shiner populations through accidental taking. Under Alternatives B, C, D, and E, closing the ACEC to minnow seining would benefit the Pecos bluntnose shiner population by eliminating any accidental taking of the shiner.

MESCALERO SANDS ACEC

Minerals Management

Mineral material disposals would cause minimal impact to wildlife and habitat under Alternatives C and D, because these actions are discretionary and would probably not be approved in critical areas. If impacts occurred, the loss of habitat from mining would be the primary, direct impact. Wildlife displacement would be expected at mining sites, within a half-mile of each operation, and within a quarter-mile of each access road. These indirect impacts would be minor, short-term, and confined to periods of mining.

Under Alternatives B, C and D, acquiring private and state lands would have positive long-term impacts to wildlife habitat management. Positive impacts include improved manageability of wildlife habitat, protection of big game/upland game habitat, and potential for increasing wildlife abundance and distribution through habitat enhancement in the area of acquisitions.

Lands and Realty Management

Under Alternative C, the location of major rights-of-way would be avoided on about 7,960 acres, but could be allowed in the ACEC on a case-by-case basis. Rights-of-way may conflict the habitats of the dunes sagebrush lizard, mule deer, and nongame birds, and with artificial wildlife waters. Short-term negative impacts include direct habitat loss from construction activities and wildlife displacement during construction. Long-term negative impacts may include wildlife habitat degradation and harassment as a result of improved public access into undisturbed wildlife habitat and human activity during maintenance of rights-of-way.

Livestock Grazing Management

Under Alternative B, D and E, excluding livestock grazing from larger areas would have long-term benefits to wildlife habitat. Key plant species in the shinnery oak-dune plant community would recover from grazing, especially those plant species grazed by livestock and preferred by wildlife. Wildlife harassment from ranching operations would be eliminated; unneeded pasture fences would be removed. Under Alternatives A and C, continuing grazing over 30 percent of the ACEC would have minimal negative impacts to wildlife habitat. Rangeland conditions would remain the same, with no improvement of wildlife habitat.

Recreation Management

Under all alternatives, off-highway vehicle (OHV) restrictions would benefit big game/upland game habitat, dunes sagebrush lizard habitat, and nongame bird species. The ACEC would be protected from undue vehicle damage. Important big game/upland game habitat areas and critical habitat for the dunes sagebrush lizard would be protected. Wildlife abundance and distribution would be enhanced over the ACEC.

FORT STANTON ACEC

Minerals Management

Under all Alternatives, about 24,630 acres would remain withdrawn from the general mining laws and closed to solid minerals leasing, resulting in long-term benefits to wildlife habitat by the protection of critical habitat for Kuenzler hedgehog cactus; important mule deer, pronghorn antelope, Mearn's quail and elk habitat; significant riparian/wetland areas and aquatic habitat on the Rio Bonito and Salado Creek.

Under Alternative B, there would be no impact to wildlife and habitat from salable mineral disposal on the 1,666-acre tract within the Sierra Blanca Regional Airport because this area has already been disturbed. Development of the five-acre community pit would have some small-scale negative impacts to wildlife and habitat. Some big game habitat would be lost at the site. Wildlife displacement in the vicinity of the mining site, wildlife harassment from improved public access to the site, and potential increased sediment load into Rio Bonito Creek from potential run-off could occur.

Under Alternatives C, D and E, there would be minimal impacts from mineral material disposal because pits would be located in areas that would not be in conflict with wildlife habitat management objectives. If pits were opened, direct impacts would be minor, short term, and result in the loss of habitat when pits are opened. Indirect impacts would be wildlife displacement at mining sites, and within a half-mile of each operation and within a quarter-mile of each access road, when mining is actually occurring. Depending on pit location, potential increased sediment loading into the Rio Bonito would occur, resulting in decreased water quality and fish habitat.

Lands and Realty Management

Under Alternatives B, D and E, about 24,630 acres would be excluded from the location of major rights-of-way, resulting in long-term benefits to wildlife habitat by the protection of critical habitat for Kuenzler hedgehog cactus; important mule deer, pronghorn antelope, Mearn's quail and elk habitat; significant riparian/wetland areas and aquatic habitat on the Rio Bonito and Salado Creek.

Under Alternative C, the location of major rights-of-way would be avoided on about 24,630 acres. It is expected that one major right-of-way would be proposed at Fort Stanton over the 20-year life of the plan. Rights-of-way would be allowed at Fort Stanton on a case-by-case basis and may conflict with wildlife resources such as big game/upland game habitat, riparian areas, fish habitat, springs/seeps, and Kuenzler hedgehog cactus habitat. Short-term negative impacts include direct habitat loss from construction activities and wildlife displacement during construction. Long-term negative impacts may include wildlife harassment and habitat degradation as a result of improved public access into undisturbed wildlife habitat, loss of wildlife habitat improvement projects, access into critical habitat for Kuenzler hedgehog cactus, loss of riparian vegetation and stream channel alterations, disturbances to caves, and continued human activity during right-of-way maintenance.

Under Alternatives B, C, D and E, acquisition of up to 1,480 acres of private and state lands would have long-term benefits to wildlife habitat management. Benefits include improved manageability of wildlife and fish habitat, protection of riparian areas and big game habitat, and the potential for increasing wildlife abundance and distribution through habitat enhancement.

Livestock Grazing Management

Under Alternatives A, D and E, the nine-month or shorter grazing period would have long-term benefits to terrestrial wildlife habitat, aquatic habitat, riparian areas, and Kuenzler hedgehog cactus habitat, because grazing management would be authorized when consistent with wildlife habitat management goals and objectives, and could be modified as needed. An improvement of wildlife, aquatic, and riparian habitats, and protection of cactus habitat would be expected, resulting in increased wildlife habitat diversity, plant diversity, and wildlife distribution and abundance.

Under Alternative B, excluding livestock grazing would have long-term benefits to wildlife habitat. Heavily grazed key plant species in each vegetative community would recover, especially those plant species grazed by livestock and preferred by wildlife. Riparian vegetation would continue to recover and support the proper functioning condition of these areas, resulting in improved fish habitat. In critical cactus habitat, herbaceous cover would increase and provide thermal cover for the cacti. Additionally, there would be no loss of cacti from livestock trampling. Wildlife harassment from livestock management activities would be eliminated and unneeded pasture fences would be removed.

Wildlife habitat diversity and wildlife distribution and abundance would increase throughout Ft. Stanton.

Under Alternative C, a nine-month or longer grazing season at Fort Stanton would have long-term negative impacts to wildlife habitat. Rangeland conditions would decline, resulting in the loss of wildlife habitat. Riparian habitat degradation would increase, resulting in increased erosion, streambank sloughing, lack of riparian plant species regeneration, and decreased water quality and fish habitat. In critical cactus habitat, herbaceous cover would decrease and would not provide adequate thermal cover for the cacti, and there would be a greater chance of cacti being trampled by livestock. Wildlife harassment from livestock management activities would increase from the wide distribution of livestock, causing a displacement of game species. Terrestrial and aquatic wildlife habitat diversity and wildlife distribution and abundance would decrease throughout Ft. Stanton.

Vegetation Management

Under Alternative B, salt cedar control by prescribed fire and mechanical methods would cause temporary impacts to wildlife habitat from the direct loss of vegetation that provides food and cover, and from minor surface disturbances depending upon the vegetative control technique being used. In most cases, fires have long-term benefits to wildlife habitat and are part of the ecological functions of many areas. Reducing salt cedar concentrations by prescribed fire, or mechanically, allows for native riparian plants to regenerate, and improves water quality and water table levels.

Under Alternatives C, D, and E, the impacts of salt cedar control are generally the same as Alternative B. However, under these alternatives, chemical treatment could be used. Treatment areas where chemicals are applied by hand are small and would not affect wildlife habitat. All alternatives have long-term benefits to riparian and wildlife habitat by allowing for native plant regeneration, and improving water quality and water table levels.

Recreation Management

Under all alternatives, upgrading and maintaining existing recreation facilities would cause minor habitat loss within the designated recreational areas and trails. Upgrading the sites would promote visitation to the areas, with recreationists dispersing to adjacent wildlife habitat areas to pursue various recreational activities. The short-term negative impact would be an increase in wildlife harassment and displacement in the area during upgrade and maintenance activities, with wildlife returning after activity ceases. The long-term negative impacts at the Rio Bonito Campground could be the potential degradation of riparian habitat and point source pollution of aquatic habitat, and a decrease in water quality and fish habitat. There would be no significant impacts to wildlife and habitat at the Fort Stanton Cave Campground, because the focus of activity is on the cave.

Under all alternatives, adding multi-use trails to the existing 40 miles of trails at Fort Stanton would not have significant impacts to wildlife and habitat, in terms of habitat loss, because the new trails are mainly existing roads and trails. Promoting the trail system would potentially increase human activity throughout Fort Stanton and cause wildlife harassment and displacement along the trails, potential loss of Kuenzler cactus from off-trail riding in critical habitat, and potential conflicts between trail users and hunters. The magnitude of impacts is greatest under Alternatives D and E. Alternatives A and B would have the least impacts to wildlife and habitat. Long-term benefits may include greater public awareness of wildlife habitat and riparian area management at Fort Stanton, enhancement of the Watchable Wildlife initiative, and the potential for implementing habitat improvement projects using volunteer trail user groups.

Under Alternatives B, C, and D, camping restrictions to protect riparian areas and livestock/wildlife waters would have long-term benefits to wildlife and habitat. Benefits include protection of riparian vegetation and water quality, protection of watering sources for wildlife, a decrease in wildlife harassment, and an increase in wildlife abundance in the vicinity of riparian areas and water sources.

Under Alternatives C and D, the proposed walk-in primitive campground would have minor impacts to wildlife and habitat, if constructed. There would be some disturbance to vegetation at the site, but no large-scale improvements would be constructed. Wildlife disturbance would be limited to the campground. Temporary wildlife displacement closed to solid minerals leasing, resulting in long-term benefits to wildlife habitat by the protection of critical habitat for Kuenzler hedgehog cactus; important mule deer, pronghorn antelope, Mearn's quail and elk habitat; significant riparian/wetland areas and aquatic habitat on the Rio Bonito and Salado Creek.

Under Alternative B, there would be no impact to wildlife and habitat from salable mineral disposal on the 1,666-acre tract within the Sierra Blanca Regional Airport because this area has already been disturbed. Development of the five-acre community pit would have some small-scale negative impacts to wildlife and habitat. Some big game habitat would be lost at the site. Wildlife displacement in the vicinity of the mining site, wildlife harassment from improved public access to the site, and potential increased sediment load into Rio Bonito Creek from potential run-off could occur.

Under Alternatives C, D and E, there would be minimal impacts from mineral material disposal because pits would be located in areas that would not be in conflict with wildlife habitat management objectives. If pits were opened, direct impacts would be minor, short term, and result in the loss of habitat when pits are opened. Indirect impacts would be wildlife displacement at mining sites, and within a half-mile of each operation and within a quarter-mile of each access road, when mining is actually occurring. Depending on pit location, potential increased sediment loading into the Rio Bonito would occur, resulting in decreased water quality and fish habitat.

Lands and Realty Management

Under Alternatives B, D and E, about 24,630 acres would be excluded from the location of major rights-of-way, resulting in long-term benefits to wildlife habitat by the protection of critical habitat for Kuenzler hedgehog cactus; important mule deer, pronghorn antelope, Mearn's quail and elk habitat; significant riparian/wetland areas and aquatic habitat on the Rio Bonito and Salado Creek.

Under Alternative C, the location of major rights-of-way would be avoided on about 24,630 acres. It is expected that one major right-of-way would be proposed at Fort Stanton over the 20-year life of the plan. Rights-of-way would be allowed at Fort Stanton on a case-by-case basis and may conflict with wildlife resources such as big game/upland game habitat, riparian areas, fish habitat, springs/seeps, and Kuenzler hedgehog cactus habitat. Short-term negative impacts include direct habitat loss from construction activities and wildlife displacement during construction. Long-term negative impacts may include wildlife harassment and habitat degradation as a result of improved public access into undisturbed wildlife habitat, loss of wildlife habitat improvement projects, access into critical habitat for Kuenzler hedgehog cactus, loss of riparian vegetation and stream channel alterations, disturbances to caves, and continued human activity during right-of-way maintenance.

Under Alternatives B, C, D and E, acquisition of up to 1,480 acres of private and state lands would have long-term benefits to wildlife habitat management. Benefits include improved manageability of wildlife and fish habitat, protection of riparian areas and big game habitat, and the potential for increasing wildlife abundance and distribution through habitat enhancement.

Livestock Grazing Management

Under Alternatives A, D and E, the nine-month or shorter grazing period would have long-term benefits to terrestrial wildlife habitat, aquatic habitat, riparian areas, and Kuenzler hedgehog cactus habitat, because grazing management would be authorized when consistent with wildlife habitat management goals and objectives, and could be modified as needed. An improvement of wildlife, aquatic, and riparian habitats, and protection of cactus habitat would be expected, resulting in increased wildlife habitat diversity, plant diversity, and wildlife distribution and abundance.

Under Alternative B, excluding livestock grazing would have long-term benefits to wildlife habitat. Heavily grazed key plant species in each vegetative community would recover, especially those plant species grazed by livestock and preferred by wildlife. Riparian vegetation would continue to recover and support the proper functioning condition of these areas, resulting in improved fish habitat. In critical cactus habitat, herbaceous cover would increase and provide thermal cover for the cacti. Additionally, there would be no loss of cacti from livestock trampling. Wildlife harassment from livestock management activities would be eliminated and unneeded pasture fences would be removed.

Wildlife habitat diversity and wildlife distribution and abundance would increase throughout Ft. Stanton.

Under Alternative C, a nine-month or longer grazing season at Fort Stanton would have long-term negative impacts to wildlife habitat. Rangeland conditions would decline, resulting in the loss of wildlife habitat. Riparian habitat degradation would increase, resulting in increased erosion, streambank sloughing, lack of riparian plant species regeneration, and decreased water quality and fish habitat. In critical cactus habitat, herbaceous cover would decrease and would not provide adequate thermal cover for the cacti, and there would be a greater chance of cacti being trampled by livestock. Wildlife harassment from livestock management activities would increase from the wide distribution of livestock, causing a displacement of game species. Terrestrial and aquatic wildlife habitat diversity and wildlife distribution and abundance would decrease throughout Ft. Stanton.

Vegetation Management

Under Alternative B, salt cedar control by prescribed fire and mechanical methods would cause temporary impacts to wildlife habitat from the direct loss of vegetation that provides food and cover, and from minor surface disturbances depending upon the vegetative control technique being used. In most cases, fires have long-term benefits to wildlife habitat and are part of the ecological functions of many areas. Reducing salt cedar concentrations by prescribed fire, or mechanically, allows for native riparian plants to regenerate, and improves water quality and water table levels.

Under Alternatives C, D, and E, the impacts of salt cedar control are generally the same as Alternative B. However, under these alternatives, chemical treatment could be used. Treatment areas where chemicals are applied by hand are small and would not affect wildlife habitat. All alternatives have long-term benefits to riparian and wildlife habitat by allowing for native plant regeneration, and improving water quality and water table levels.

Recreation Management

Under all alternatives, upgrading and maintaining existing recreation facilities would cause minor habitat loss within the designated recreational areas and trails. Upgrading the sites would promote visitation to the areas, with recreationists dispersing to adjacent wildlife habitat areas to pursue various recreational activities. The short-term negative impact would be an increase in wildlife harassment and displacement in the area during upgrade and maintenance activities, with wildlife returning after activity ceases. The long-term negative impacts at the Rio Bonito Campground could be the potential degradation of riparian habitat and point source pollution of aquatic habitat, and a decrease in water quality and fish habitat. There would be no significant impacts to wildlife and habitat at the Fort Stanton Cave Campground, because the focus of activity is on the cave.

Under all alternatives, adding multi-use trails to the existing 40 miles of trails at Fort Stanton would not have significant impacts to wildlife and habitat, in terms of habitat loss, because the new trails are mainly existing roads and trails. Promoting the trail system would potentially increase human activity throughout Fort Stanton and cause wildlife harassment and displacement along the trails, potential loss of Kuenzler cactus from off-trail riding in critical habitat, and potential conflicts between trail users and hunters. The magnitude of impacts is greatest under Alternatives D and E. Alternatives A and B would have the least impacts to wildlife and habitat. Long-term benefits may include greater public awareness of wildlife habitat and riparian area management at Fort Stanton, enhancement of the Watchable Wildlife initiative, and the potential for implementing habitat improvement projects using volunteer trail user groups.

Under Alternatives B, C, and D, camping restrictions to protect riparian areas and livestock/wildlife waters would have long-term benefits to wildlife and habitat. Benefits include protection of riparian vegetation and water quality, protection of watering sources for wildlife, a decrease in wildlife harassment, and an increase in wildlife abundance in the vicinity of riparian areas and water sources.

Under Alternatives C and D, the proposed walk-in primitive campground would have minor impacts to wildlife and habitat, if constructed. There would be some disturbance to vegetation at the site, but no large-scale improvements would be constructed. Wildlife disturbance would be limited to the campground. Temporary wildlife displacement would occur during site occupation. There would be some wildlife harassment in the vicinity of the campground when visitors disperse from the site into undisturbed wildlife habitat to pursue various recreational activities.

Under Alternatives B, D and E, off-highway vehicle restrictions would produce long-term benefits to riparian areas along the Rio Bonito, Salado Creek, springs/seeps, big game/upland game habitat, and to Kuenzler hedgehog cactus habitat. Benefits are the preservation of riparian areas from undue vehicle damage, protection and seclusion of important big game/upland game habitat areas, protection of critical habitat for Kuenzler cactus, decreased upland erosion and sedimentation of aquatic habitat, and enhanced wildlife abundance and distribution over the entire Fort Stanton area.

Under Alternatives A and C, impacts from OHV restrictions would be the same as Alternative B, but the magnitude of those impacts would be greater under Alternatives A and C, because restrictions would apply only to about one-half of the acreage at Fort Stanton. Negative impacts include OHV use in big game habitat, primarily in the east half of Ft. Stanton, resulting in wildlife harassment and habitat degradation from vehicle access and human activity in undisturbed areas.

Under Alternatives C, D and E, the magnitude of impacts to wildlife habitat from new developments and increased human activity is greater than Alternatives A and B. The development of a wayside would result in direct habitat loss of about two acres for access and facilities, potential noise and visual disturbance to a resident pronghorn antelope herd from human activity, and potential riparian habitat degradation. The development of two overlooks would result in direct habitat loss of about two acres for access and parking facilities and wildlife harassment from visitation and visual intrusions into undisturbed wildlife habitat. The long-term negative impacts would be the decline of big game habitat conditions and wildlife harassment at both sites resulting from increased human activity. At the north overlook site, potential negative impacts from collecting and trampling may occur to Kuenzler hedgehog cactus in the vicinity of the site. Long-term benefits from the wayside and overlooks include greater public awareness of wildlife habitat, T/E species, and riparian area management at Ft. Stanton through interpretive programs at these sites.

There would be minor impacts to wildlife habitat from the development of an interpretive site at the Lower Stanton Pueblo Ruin.

Under Alternative A, the seasonal closure of Fort Stanton Cave annually from November 1 through March 31 would continue to benefit cave-adapted wildlife, specifically wintering bat populations. However, that time period may not be adequate to protect the bat hibernacula, resulting in a long-term negative impact to bat populations at the cave. Negative impacts include direct loss of bat species through stress and abandonment of the cave.

Under Alternatives B, C, D and E, the extended annual seasonal closure from November 1 through April 15 would have long-term benefits to bat populations at Fort Stanton Cave. The bat hibernacula would be protected from life-threatening human disturbances.

Wildlife Habitat Management

Under Alternatives B, C, D and E, big game/upland game and native and game fish transplants and reintroductions would benefit wildlife and fish populations at Fort Stanton. Improved distribution and enhanced gene pools of game species would contribute to more viable wildlife populations at Fort Stanton, especially when coupled with wildlife habitat improvement projects.

Under Alternatives B, C, D and E, riparian and aquatic habitat improvement projects would produce long-term benefit to wildlife and fish species dependent on these areas. Benefits include stabilized stream channels, decreased sedimentation, enhanced native riparian vegetation, increased fish habitat diversity and populations, increased forage production for wildlife, and an overall increase in wildlife use and abundance in and adjacent to riparian areas.

Fire Management

Under Alternative A, prescribed fires and fuelwood sales in the pinon-juniper community type would cause temporary impacts to wildlife habitat from the direct loss of vegetation that provides food and cover. In most cases, fires have long-term benefits to wildlife and habitat and are part of the ecological functions of many areas. Nutrients tied up in plant biomass are returned to the soil, forb production typically increases, grasses and some shrub species are invigorated, habitat becomes a more diverse vegetative mosaic, and edge that is created contributes to species diversity. A change would occur in wildlife species to those that prefer an early vegetation seral stage.

Under Alternatives B, C, D and E, the use of prescribed fire is expanded to include riparian and grassland community types. The impacts to wildlife and habitat are similar to those under Alternative A. The long-term benefits of prescribed fire in riparian and adjacent grassland areas include enhancing riparian vegetation and vigor of grass species, controlling invading junipers, increasing infiltration of surface water, improving water quality and prolonging base flows. Terrestrial wildlife and aquatic species diversity and abundance would increase in areas of treatment. The magnitude of impacts to wildlife habitat under these alternatives is greater than Alternative A, because prescribed fire would be used on more acreage for wildlife habitat improvement.

Under all alternatives, wildfires and suppression activities would temporarily displace wildlife species in the vicinity of the fire. There would be no significant loss of wildlife or habitat. T/E plant species may be lost where wildfires occur in occupied habitat and when full suppression activities are implemented. To protect Kuenzler cactus at Fort Stanton, full suppression activities would be employed, but heavy equipment would not be used to construct fire lines.

ROSWELL CAVE COMPLEX ACEC

Under Alternative A, there would be long-term benefits to cave-adapted wildlife, specifically bat populations, at the three caves managed according to cave management plans. Negative impacts would occur on the remaining six caves without specific plans. Impacts include the direct loss of cave habitat from mineral development, direct loss of bat species from stress and abandonment of caves, wildlife harassment at the caves and in the vicinity of caves from OHV use, potential dumping of trash or hazardous materials into unprotected caves, contamination of groundwaters affecting cave biota, and siltation of the caves also affecting cave biota.

Under Alternatives B, C, and D, all prescriptions for the proper management of the nine cave resources would have long-term benefits for cave-adapted wildlife, specifically wintering bat populations. The magnitude of long-term cave resource protection for wildlife habitat is greatest under Alternative E.

Protected is accomplished by mineral closures and withdrawals affecting about 15,000 acres in the ACEC, prohibiting the use of carbide lamps, constructing fence exclosures around cave entrances, and limiting wildfire suppression activities.

SOCIAL AND ECONOMIC

The only social impacts expected from any of the alternatives addressed in this document would be changes in social well-being. The beliefs and desires of individuals can be translated into "wants." The "wants" of each individual would be based initially on concern with local economic development and preservation or improvement of lifestyle, as it relates to them. As the necessities of life are met, individuals can then broaden their spectrum of "wants" to include amenities, including interest in amenities related to natural resources. In terms of categorizing the "wants" of some interest or user groups, however, the wider spectrum of beliefs and desires of individuals may be narrowed by the group. For example, users of the public lands for agriculture, as a group, would seem to want to maintain low grazing fees, ready access to the land, adequate forage for their livestock, and continuation of the rural, agriculture-based lifestyle. Those involved in producing oil and gas, or other minerals, as a group, would seem to want to limit constraints on their activities that take the form of regulations on activity and limits on access to resources. Perhaps the converse is true, as well. Those who are members of "environmental" groups or who use the public lands for recreation may, as a group, want to ensure the continued healthy existence of wildlife and vegetation, and maintain recreation opportunities based on such things as clean water, high-quality scenery, or solitude. As individuals, however, they may be less inclined to believe that commodity uses of the public lands are in conflict with other uses; they may be less concerned with consumptive uses of the public lands than is the group.

The decisions ultimately made in this RMP could affect social well-being of individuals and groups in several ways. Changes in the amount and quality of resources and the allocation of those resources for a variety of uses would affect social well-being. In some cases, decisions could affect the availability of resources, affecting the income of some individuals or companies. Each of the alternatives considered provides for some level of intensive management of public lands and resources. In many cases, intensive management is translated to mean restrictions and limitations. While this is the case, in general, no sole group of users is singled out in any alternative. The effects on social well-being are expected to be minimal under any alternative.

MINERALS MANAGEMENT

The discussion of impacts to oil and gas, near the beginning of this chapter, also contains analysis of economic impacts.

In 1992, oil and gas production from federal lands in the Roswell District generated over $106 million, plus a large share of bonuses and royalties amounting to over $14 million. On an annual basis for the district that is an average of about $8.67 per acre. This average includes federal lands that have no production, hence the producing lands generate more revenues to offset management costs and to be shared with local and state governments. The Roswell Resource Area contains about 9.74 million acres of federal (oil and gas) mineral estate and generates about seven percent of the mineral revenues for the Roswell District. The Carlsbad Resource Area generates about 93 percent of the revenues from about 4.1 million acres of federal (oil and gas) mineral estate.

The mining industry in the Roswell District provides 8,208 jobs and over $255 million in taxable gross receipts per year. This is the fifth largest industry by income in the district and the fourth largest employer. Almost all this income is money coming into the area where it get distributed as taxes, retail sales, and wholesale receipts for the benefit of all citizens.

The amount of acreage proposed for closure to leasing for oil and gas in the Roswell District does not vary greatly among the alternatives, and is a small percentage of the federal mineral estate available for leasing. Revenues to the federal treasury from bonus bids and rentals should not change appreciably from the current situation under any alternative.

Likewise, the amount of acreage to which restrictions are applied should not change dramatically from the current situation. Under Alternatives B, D, and E, there will be more acres affected by restrictions than under Alternatives A and C. Any restrictions imposed by the BLM on exploration, drilling, or production could increase costs for developing oil and gas. In the extreme, restrictions could decrease federal receipts and the revenues available for sharing with state and local governments because companies would decrease their development and production activities. However, it is expected that exploration, development and production will be largely influenced by outside factors, such as the price of oil, not by the added cost of restrictions. Any additional costs resulting from restrictions likely would be absorbed in the cost of doing business. The costs that could result from restrictions under any alternative are related primarily to additional surface protection and are expected overall to be a small percentage of the total cost of developing oil or gas wells.

Restrictions proposed under Alternatives B, C, D and E, are essentially modifications of restrictions already in effect under current management. These restrictions may include relocating a drilling site, which should have minimal or no cost, if the move is done before surveying and cultural inventories are conducted. The impact of having to resurvey a drilling location can be mitigated by better coordination between operators and the BLM, including better planning and more advance notice of intentions on the part of the operator.

Impact mitigations, such as installing caps on treater stacks or constructing berms around a drilling pad, can add to development costs, but are inexpensive when compared to the cost of drilling. Timing restrictions could create an economic impact as a result of disruptions to drilling plans or drilling rig downtime. Timing delays sometimes affect rig availability and create scheduling difficulties. This situation can be mitigated through better advance planning and contact with the BLM by operators anticipating a drilling program in prairie chicken habitat. Under any alternative, additional downhole costs should be rare, unless drilling occurs in a cave or karst area where specific downhole mitigations are required as a result of the cave and karst drilling practices proposed for each alternative.

The economic contribution of mining locatable minerals is not expected to be significant, under any alternative, unless there is an unforeseen change in the demand for certain minerals or an unexpected discovery of minerals. While there currently is a substantial number of mining claims in the resource area, the mining activity on those claims is minimal. Under current law, there is no royalty paid on the extraction of federal locatable minerals. The payment of annual assessment fees to keep mining claims current provides a source of revenue to the federal treasury. Any other economic return from mining is tied to such things as wages paid, the purchase of equipment and supplies, and the payment of taxes on equipment, property, and income.

The development of solid leasable minerals from federal leases generated over $4.4 million in 1992 in Eddy and Lea counties, with the majority from the world-class deposits of potash. On the basis of over 1.8 million acres of BLM-managed land in these two counties, that is about $2.41 per acre derived from these lands. The leasing and development of potash affects opportunities for oil and gas drilling, in some areas. Leases held by oil companies may be affected by the leasing of potash because some areas of a lease may not be drilled due to conflicts with potash mining. This may cause an economic impact to the oil and gas industry because of the inability to recover all available oil and gas reserves lying below the potash zones. However, the mitigation of economic and other impacts to the oil and gas industry resulting from the leasing of potash are beyond the purview of this land use plan because potash is leased and developed pursuant to Secretarial Order, not according to BLM land use planning.

The leasing of solid minerals in the Roswell Resource Area produces revenue in the form of royalties and creates employment. Mining of solid leasable minerals essentially is nonexistent, although a small amount of exploration for sulfur has occurred in the last few years.

Saleable minerals, mostly caliche with small amounts of sand or gravel, are used by the oil and gas industry for surfacing drilling and production pads and access roads. The demand for mineral materials is generated primarily by the oil and gas industry. That demand, and the economic benefit that results, are expected to remain fairly constant. The revenue from the sale of mineral materials in the Roswell Resource Area annually amounts to about $25,000. In the Carlsbad Resource Area, the annual sales of mineral materials, mostly to the oil and gas industry, amounts to about $350,000. The BLM also provides free use of mineral materials to local governments for road construction purposes. Mineral materials disposed of annually under free use permits in the Roswell Resource Area amounts to about 160,000 cubic yards worth about $75,000. The free use of these materials is an economic benefit to local governments whose limited operating funds are derived from taxes and other sources. Individuals also purchase mineral materials at low cost from community pits, which can be viewed as an economic benefit because it provides a source of low cost, unprocessed mineral material for the general public.

LANDS AND REALTY MANAGEMENT

The disposal of public lands through exchanges or sales under any alternative could produce an economic impact, although in many cases the impact would be minimal. Lands currently in public ownership are not taxed by local governments, but the lack of tax revenue from public lands is offset by payments in lieu of taxes (PILT). Lands leaving public ownership would be taxed at local rates, giving local government the possibility of an increased tax base. In the case of undeveloped rangeland, however, monies from PILT may actually exceed the revenue generated by local taxation. Counties and other taxing entities gaining land converted from public ownership may actually receive less revenue per acre than before.

If the disposal is by exchange, acreages of equal monetary value are exchanged, so the loss of higher value private lands in exchange for lesser value public lands should not cause a significant shift in tax or PILT revenue to local governments, unless the lands acquired by the BLM are not in the same county as the disposed lands. In that case, one local government could lose tax base because the PILT would be less that the taxes generated from highly valued land. The county acquiring land would increase its revenue as a result of adding additional acreage to its tax rolls.

The majority of lands identified for consideration for disposal are located in Lincoln County and are tied to completion of the Rio Bonito Exchange. Most of these lands are rangelands for which PILT is equal to or greater than the per acre tax revenue for similar private lands. If these lands are transferred to private ownership, Lincoln County could receive reduced revenue, based strictly on land value, not including any taxes paid on livestock or improvements. On the other hand, ranchers acquiring these lands would benefit by improved management capability (fewer intermingled tracts of more than one ownership) and the potential for greater livestock production.

The direct benefits of land disposals affect both the BLM and landowners. The BLM is able to reduce the amount of isolated, hard to manage public lands in its inventory, which should result in a savings in cost of management of those parcels. When the disposal involves an exchange, the BLM gains important lands to further its management objectives and policies. A common secondary benefit of the acquisition of high quality land is an increase in recreation use, which may translate into increases in user fees and expenditures in nearby communities for lodging, fuel and food.

When ranchers or farmers acquire adjacent public lands through exchange or direct purchase, they are potentially able to improve their economic situation by reducing the cost of managing land under two ownerships, by increasing management efficiency, and by having a larger land base from which to produce livestock, forage or crops. If land is disposed of to individuals who develop the land for industrial, business or residential purposes, the economic impacts generally are beneficial to local governments because of a substantially increased tax base and to the developer who hopes to make a profit on the development.

Under Lands and Realty Management Alternative A, the disposal of as many as 3,155 acres would result in a permanent loss of annual BLM grazing receipts from approximately 720 AUMs. Under Alternatives B, C, D, and E, the disposal of as many as 150,000 acres would result in a permanent loss of annual grazing receipts from approximately 34,260 AUMs, which amounts to approximately 10 percent of the current permitted AUMs. Based on current grazing fees, this would amount to an annual reduction of nearly $62,000 in grazing fees collected in the Roswell Resource Area. At the same time, the BLM's land management costs, including administration of livestock grazing, would be reduced as a result of the disposal of small, isolated tracts of land that are difficult or uneconomical to manage.

Fifty percent of the grazing fees collected from lands outside the grazing district is returned by the BLM to the state for use in the counties. Similarly, of the grazing fees collected from within the grazing district, 12.5 percent is returned to the state. If public lands were disposed of, the State of New Mexico would lose that grazing-related income. However, these payments to the state may be offset by property taxes paid to the counties by the new landowners.

Grazing allotment holders could be adverse affected if land uses change, or if lands are sold or exchanged with someone other than the allottee. Benefits would be expected if the land sold or exchanged became private property of the grazing allotment holders already using the land.

Fees and rentals collected for authorizations such as rights-of-way are deposited in the federal treasury. As an example of the economic benefit of use fees and rentals, during the period of May 1, 1993, through May 1, 1994, approximately $144,000 was collected in the Roswell Resource Area from filing fees and rentals.

LIVESTOCK GRAZING MANAGEMENT

Approximately 70 percent of the agricultural receipts in the counties of Chaves, Guadalupe, Roosevelt, Lincoln, Curry, DeBaca, Quay, Lea, and Eddy in 1988 came from livestock production. The first seven counties listed produced $270,000,000 from livestock production on all land ownerships. With a land area of about 13,965,000 acres, the production from livestock was $19.33 per acre, if the land was totally available and dedicated to livestock management. This includes operations such as dairies, feedlots and ranches. On a proportional basis, if the 1,490,000 acres of public land in the Roswell Resource Area were totally available and dedicated to livestock grazing, the per-acre production would be about $28,801,700. Payments in FY93 to the federal treasury from livestock producers using public land for 329,468 AUMs of licensed grazing use were $619,011.

Under alternative A, allotments included in the Caprock WHA would include rest treatments of between 16 and 24 months out of 48 consecutive months. This is a period of non-production between 33 and 50 percent, and on an annual basis would reduce the apparent production to between $12.25 and $9.15 per acre. Vegetation treatments under any alternative will, likewise, require a period of rest to allow successful treatment. Rest period could cause short-term economic impacts similar to those just described. However, those impacts would be offset by increased forage production and a potential increase in stocking rates after two years.

When the Billy the Kid recreation site is developed, grazing would be eliminated, resulting in the elimination of 12 AUMs (for one cow, yearlong). The loss of vegetation due to surface disturbance from oil field development and other activities would continue to affect the amount of forage available for livestock grazing. However, reductions in carrying capacity resulting directly from surface disturbance have not been made in the past and are not expected to be made in the future, in most situations. Thus, there is negligible economic impact to livestock operations from surface disturbance.

Management proposed for the Overflow Wetlands ACEC would require the cancellation of grazing in one allotment, which would be a reduction of 119 AUMs. Livestock grazing in the Mescalero Sands ACEC would either remain partially excluded on about 1,800 acres under Alternatives A and C, as it is now, or be entirely eliminated in one allotment and adjusted on 3,000 acres in three other allotments under Alternatives B and E. The area where grazing would be excluded would increase by about 30 percent under Alternative D. Under Alternative B, 1,225 AUMs would be eliminated, as would 96 AUMs under Alternatives D and E. Grazing in the Fort Stanton ACEC would continue under all alternatives except B, as a tool for vegetation management. No grazing preference has been, or will be, established. Grazing at Fort Stanton has been permitted under a system where forage is sold by means of a bidding system; the use of AUMs is granted to the high bidder for each pasture. The bid price varied from a minimum of $5.00 per AUM to $16.38 per AUM for the 3,015 AUMs available in the 1993/1994 contract period. This process, with bids similar to those offered in the past, is expected to be used in the future.

OUTDOOR RECREATION MANAGEMENT

The tourist industry provides 5,113 jobs and $118,262,000 per year in the RRA for lodging and restaurants. Each visitor spends an estimated $95 per visitor day. Recreation-related visitation has been increasing at a rate of about 7 percent annually. The development of the UFO site under Alternative C, the proposed developments of the Rio Bonito acquired lands under Alternatives B, C, D, and E, and the continued improvement of facilities at Valley of Fires and Fort Stanton all should increase local revenue from recreation visitation. Day-use developments at the Billy the Kid recreation site, the Garnsey Bison Kill site, and Overflow Wetlands likely will not produce much economic impact, if any, because of the nature of the development.

Further development of OHV use areas at Mescalero Sands and Haystack Mountain could be expected to increase sales of fuel in Roswell and other towns in the area, as more OHV use is encouraged at those sites. Greater restrictions on OHV use in the remainder of the resource area under all alternatives except A would affect social and economic conditions, but the actual effect is difficult to estimate. The restrictions should help control or reduce resource damage, which would reduce the economic costs of that damage, such as soil erosion and vegetation loss, that are borne by the general population. The freedom of OHV use would be somewhat limited, affecting those recreationists who rely heavily on OHVs. Vehicle use restrictions also would affect business-related use of OHVs to an extent, although permitted uses (such as that related to livestock management or oil and gas exploration) may be exempted from some restrictions.

The more intensive management of wildlife habitat, especially in areas covered by habitat management plans, would contribute the increase in the size and vigor of wildlife populations. Wildlife habitat improvement projects could provide some collateral benefit to livestock grazing. But, at the same time, ranchers may view the improvement of habitat with an attendant increase in wildlife as a negative accomplishment, because of the potential increase in competition with livestock for forage. More wildlife benefits recreation and business related to recreation as more hunting can be accommodated as populations grow.

The intensive management of cultural resources proposed under Alternatives B, C, D, and E, not only protects those resources, but indirectly provides an opportunity for an economic benefit related to visitor use of those areas. While most use is expected to be day use, a limited amount of economic activity may be generated.

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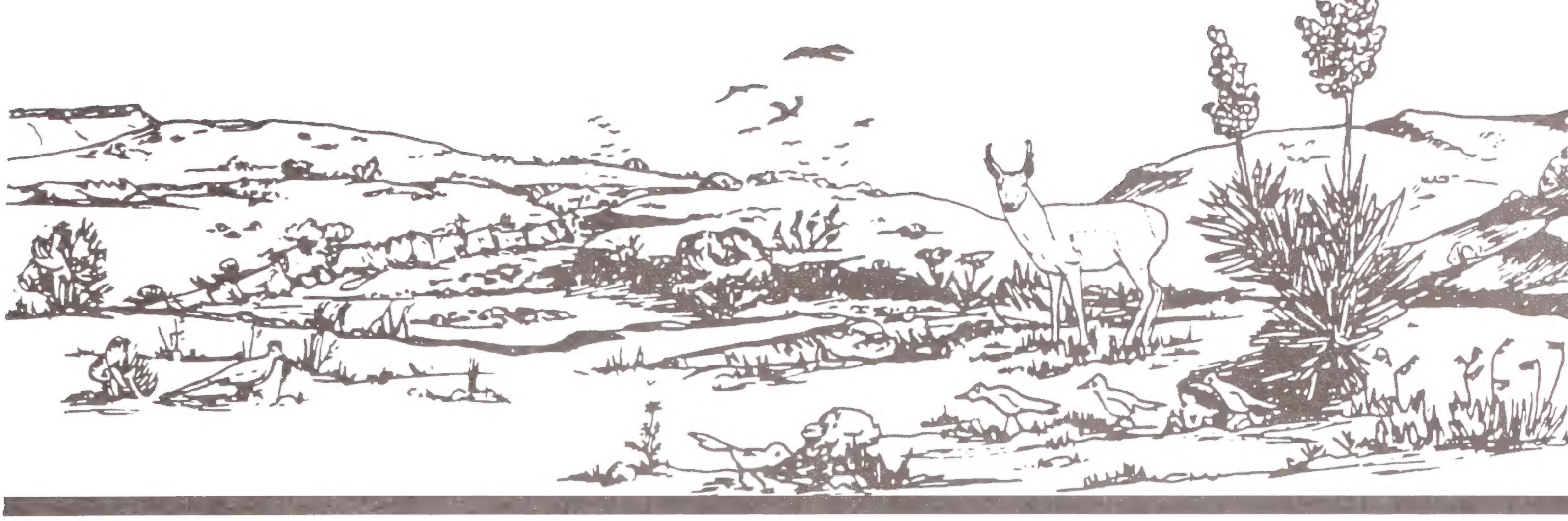
BLM Volunteers work on varied projects, including installing signs.



CHAPTER 5
CONSULTATION AND COORDINATION

INTRODUCTION

Resource specialists in the Roswell and Carlsbad resource areas prepared the Roswell Resource Management Plan (RMP) and the Carlsbad Resource Management Plan Amendment (RMPA). The environmental impact statement (EIS) for the two RMPs was prepared primarily by staff in the Roswell Resource Area. Table 107 lists the principals in the preparation of this plan. Numerous other individuals from the resource areas, district and state offices, as well as other federal, state, county representatives, and public individuals provided valuable assistance in the formulation of this plan. The Roswell District Office and New Mexico State Office management teams and resource program leaders provided technical and policy reviews.

Consultation, coordination, and public involvement have occurred throughout the planning process through scoping meetings, informal meetings, individual contacts, news releases, and *Federal Register* notices.

Initial steps in the planning process began in 1988, with the development of a preparation plan. Other early efforts included research, inventory, analysis, and interagency coordination.

PUBLIC PARTICIPATION

A public participation plan was prepared to provide management and team guidance for developing the resource management plan and environmental impact statement, and to ensure public involvement during the entire resource management plan and environmental impact statement preparation process. Both formal and informal input have been encouraged and used in the preparation of the RMP and RMPA.

A notice published in the *Federal Register* on August 25, 1989, announced the intention of the BLM to prepare a resource management plan and requested information on resources and proposed future uses of resources in the Roswell Resource Area. Letters and a news release requesting the participation of persons and organizations who wanted involvement in the planning process were mailed in October 1989.

A letter was mailed in December 1989, requesting information and comments on preliminary issues and concerns which would guide the preparation of the Roswell Resource Management Plan. A notice published in the *Federal Register* in January 1990, announced the call for coal and other resource information.

Public scoping meetings were conducted with Lincoln County Commissioners, September 10, 1990; DeBaca County Commissioners, September 11, 1990; City Officials of Santa Rosa, September 11, 1990; Chaves County Commissioners, September 13, 1990; Eddy County Commissioners, September 18, 1990; Quay County Commissioners, September 24, 1990; City Officials of Carrizozo, September 25, 1990; Roosevelt County Commissioners, October 1, 1990; Curry County Commissioners, October 2, 1990; and City Officials of Roswell, October 9, 1990.

A *Federal Register* notice published on June 13, 1991, announced the Carlsbad Resource Area was initiating the preparation of a resource management plan amendment (RMPA). The resource management plan amendment and environmental impact statement (EIS) would be prepared in conjunction with the Roswell Resource Management Plan.

Open houses were held during July 1991, in Roswell, Hobbs, Capitan and Carlsbad, New Mexico. A questionnaire and description of planning issues were handed out; more than 100 responses were received from the public.

The Roswell District Advisory Council has been apprised of progress on the RMP, and comments and recommendations of the members have been solicited.

The BLM's personnel met formally and informally with many members of the ranching and minerals industries and with other interest groups. A summary of comments generated from these meetings is maintained at the Roswell Resource Area Office.

Meetings were held in 1992, to discuss the concept of desired plant community (DPC) and to explain the development of the DPC process proposed for the Roswell RMP. Community meetings were held in Vaughn, Elida, Capitan, Artesia, and Roswell. Briefings were held in Roswell with members of the Roswell District Grazing Advisory Board, Roswell District Advisory Council, New Mexico Department of Game and Fish, representatives of environmental organizations, such as the Sierra Club, and with BLM representatives from the New Mexico State Office. Members of the New Mexico Range Improvement Task Force were briefed during a meeting in Las Cruces.

Early in 1993, three citizen work groups were formed to assist RMP team members in the development of planning alternatives. These work groups reviewed preliminary alternatives, and provided advice and recommendations on the further development of the alternatives. Table 108 lists the members of these groups.

Information regarding special status species was requested from the U.S. Fish and Wildlife Service, the New Mexico Energy, Minerals and Natural Resources Department, and the New Mexico Department of Game and Fish. The data was used and the lists of special status species are found in Appendixes 16 and 17.

The BLM will continue consultation and coordination under the Endangered Species Act, by preparing a biological assessment for threatened and endangered species as part of Section 7 consultation. BLM's anticipated "No Effect" determination is based on the use of leasing stipulations, lease notices, surface occupancy requirements and conditions of approval, impact assessments and agency coordination prior to site specific federal actions.

CONSISTENCY WITH OTHER PLANS

Coordination with other agencies and consistency with other plans were accomplished through frequent communications and cooperative efforts between the BLM and involved federal, state, and local agencies and organizations.

State, county and local governments and agencies were formally notified of the intent to begin planning. These organizations were briefed prior to starting development of the RMP/RMPA. Some of them also participated in developing and defining issues and planning criteria.

Land use plans prepared by other agencies were reviewed during the planning process. The following resource management plans were reviewed during the planning process: draft and final White Sands RMPs/EISs; draft Taos RMP/EIS; draft and final Socorro RMPs/EISs; draft and final Mimbres RMPs/EISs; draft Albuquerque District RMP/EIS on Oil and Gas Leasing and Development. Relevant parts of those plans were incorporated in the development of planning issues and criteria, which provided the basis for formulating alternatives.

TABLE 107
LIST OF PREPARERS

Name	BLM Position/RMP Responsibility	Education and Years of Experience
Management Overview		
Leslie M. Cone	Roswell District Manager. Management Guidance.	B.S., Forestry, Colorado State University, Fort Collins, CO; MPA., Public Administration, University of New Mexico, Albuquerque, NM. 21 years BLM
Saundra L. Allen	Roswell Resource Area Manager. Management Guidance, Impact Analysis.	A.A., Business Administration, Western Wyoming College, Rock Springs, WY. 25 years BLM
Richard L. Manus	Carlsbad Resource Area Manager. Management Guidance.	B.S., Natural Resource Management, Humboldt State College, Arcata, CA. 25 1/2 years BLM.
RMP/EIS Core Team		
David Stout	Assistant Area Manager, Roswell Resource Area. RMP/EIS Team Leader (Nov. 1992-Present), document preparation, technical coordination.	B.S., Outdoor Recreation, Colorado State University, Ft. Collins, CO; M.S., Park Administration, Texas Tech University, Lubbock, TX. 18 1/2 years BLM.
Thomas P. Kelley	RMP Team Leader, Roswell Resource Area. RMP/EIS Team Leader (Jan. 1989-Nov. 1992), document preparation, technical coordination. Natural Resource Specialist, Roswell Resource Area (Nov. 1992-July 1994), GIS coordination and map preparation. Data Application Specialist, Roswell District Office (July 1994-present), GIS coordination and map preparation.	B.S., Agriculture (Range Management and Soil Science), California State University, Chico, CA. 5 years U.S. Forest Service and 16 years BLM.
Jamie Sue Franchini	Editorial Assistant, Roswell Resource Area. Editing, tables, graphics, glossary, and reference preparation, review, and preparation of Chapter 5.	Attended Eastern New Mexico University, Portales, NM. 9 years U.S. Geological Survey and 7 years BLM.

TABLE 107 (Continued)

Name	BLM Position/RMP Responsibility	Education and Years of Experience
Chuck Hunt	Chief of Multi-Resources, Roswell Resource Area. Preparation of Chapter 3, DPC development, document preparation, and review.	B.A., Natural Resources, Lamar University, Beaumont, TX; M.P.A., Public Administration, Texas A & M University, Bryan, TX. 5 years BLM.
Interdisciplinary Team		
Dan Baggao	Lead Wildlife Management Biologist, Roswell Resource Area. Wildlife (including development of community types for Desired Plant Community concept), riparian-wetlands, special status species, and biological Areas of Critical Environment Concern (ACEC).	B.S., Wildlife Science and B.S., Fishery Science, New Mexico State University, Las Cruces, NM. 16 years BLM.
Jerry W. Ballard	Lead Outdoor Recreation Planner, Roswell Resource Area. Recreation, visual resource management, cave management, and wilderness.	B.S., Environmental Resources, Concentration in Resource Management and Park Administration; Minor, Physical Geography. A.A., Forestry, California State University, Sacramento, CA. 12 years National Park Service; 5 years Army Corps of Engineers; 5 years BLM.
Michael J. Bilbo	Outdoor Recreation Planner, Roswell Resource Area. Cave ACEC's, recreation maps, and data gathering for Multi-Resources.	B.S., Park Administration-Interpretive, Texas Tech University, Lubbock, TX. 4 years BLM.
Jerry Dutchover	Geologist, Roswell Resource Area. Saleables, locatables, non-energy leasables, and leasable minerals portions of the RMP.	B.S., Geology, New Mexico State University, Las Cruces, NM. 13 years BLM.
Ken Fitzpatrick	Chief, Economic Evaluation, Eastern States Office. Socio-economics.	M.S., Geology, City College of New York, New York City, NY; M.S., Geology, Ohio State University, Columbus, NY; M.S., Library Sciences, Case-Western Reserve University, Cleveland, OH; Phd, Paleontology, Miami University, Oxford, OH; and M.S., Mineral Economics, Colorado School of Mines, Golden, CO. 5 years U.S. Bureau of Mines; 3 years U.S. Geological Survey; 1 year MMS; 11 years BLM.

TABLE 107 (Continued)

Name	BLM Position/RMP Responsibility	Education and Years of Experience
Pat Flanary	Archaeologist, Roswell Resource Area. Cultural resources and paleontology.	B.A., Anthropology, Southern Methodist University, Dallas, TX. 6 years BLM.
Rand French	Wildlife Management Biologist, Roswell Resource Area. Assisted in the compilation of data and preparation of wildlife (including the development of Community Types for the Desired Plant Community concept), riparian-wetlands, special status species, and biological Areas of Critical Environmental Concern (ACEC).	B.S., Wildlife Management, Eastern New Mexico University, Portales, NM. 7 years BLM.
Helen C. J. Miller	Range Conservationist, Roswell Resource Area. Soil, air, livestock, and vegetation (including assisting in the development of the Desired Plant Community (DPC).	B.S., Psychology; Minor, Biology and Literature, University of New Mexico, Albuquerque, NM. B.S., Wildlife Science; Minor, Range Management, New Mexico State University, Las Cruces, NM. 13 years BLM.
Irene Salas	Realty Specialist, Roswell Resource Area. Lands and realty.	Certificate of Completion, Office Occupations, Eastern New Mexico University, Roswell, NM. 17 years BLM.
Jim Schroeder	Hydrologist, Roswell District Office. Watershed and air resources.	B.S., Forestry, University of Montana, Missoula, MT.; M.S., Hydrology, University of Minnesota, St. Paul, MN. 2 years BLM.
Chuck Schmidt	Range Conservationist, Roswell Resource Area. Impact analysis for range management program.	B.S., Range Science, New Mexico State University, Las Cruces, NM. 5 years BLM.
Other Preparers, Roswell District		
Donald L. Ashby, Jr.	Supervisory Range Conservationist, Carlsbad Resource Area. RMP Team Leader for the Carlsbad Management Plan Amendment December 1992 to April 1993.	B.S., Agriculture, New Mexico State University, Las Cruces, NM. 10 years BLM.

TABLE 107 (Continued)

Name	BLM Position/RMP Responsibility	Education and Years of Experience
Stephen T. Daly	Soil Conservationist, Carlsbad Resource Area. Soil, water, and air for Carlsbad RMPA; water for Roswell RMP.	B.S., Wildlife Science, New Mexico State University, Las Cruces, NM. 13 years BLM.
David Dupre	Cartographic Technician, Roswell District Office. Cartographic displays, digitized data, and assisted in coordinating data for the resource specialists.	7 years BLM
John Glenn	Fire Management Officer, Roswell District Office. Fire management. John transferred to Idaho Falls District Office November 1992.	B.S., Forestry, Utah State University, Logan, UT. 10 years BLM
Janet Graham	Computer Specialist (GIS), Roswell District Office. Coordinator for the data collection, verification, digitizing, and map production of automated resource information.	B.S., Physical Education; Minor, Business Education, Eastern New Mexico University, Portales, NM. 12 years BLM.
James R. Goodbar	Outdoor Recreation Planner, Carlsbad Resource Area. Recreation programs, and cave and karst resources.	B.S., Park and Recreation Management ; Minor, Horticulture, Texas A & M, Bryan, TX. Graduate work, Western Kentucky University. 14 1/2 years BLM.
Paul Happel	Outdoor Recreation Planner, Roswell District Office. Assisted with recreation, visual resource management, cave management, and wilderness.	B.S., Recreation and Park Management, University of Oregon, Eugene, OR. 1 year Soil Conservation Service; 4 years National Park Service; 16 years BLM.
Ray Keller	Supervisory Range Conservationist, Roswell Resource Area. Assisted in development of DPC.	B.S., Range Management Science, Sul Ross State University, Alpine, TX. 18 years BLM.
Michael Kyte	Archaeologist, Carlsbad Resource Area. Cultural resources for Carlsbad Resource Area.	B.S., M.A., Anthropology, Graphic Arts, Eastern New Mexico University, Portales, NM. 3 years BLM.
Larry LaPlant	Wildlife Management Biologist, District Office. Assisted in development of DPC.	B.S., Wildlife Management, University of Montana, Missoula, MT. 12 years Department of Army and 15 years BLM.

TABLE 107 (Continued)

Name	BLM Position/RMP Responsibility	Education and Years of Experience
Roger Maynard	Geologist, Roswell District Office. Acquired and assembled oil and gas, and other minerals data for the RFD.	B.A., Geology, Vanderbilt University, Nashville, TN; Master's work, Texas A & M, Byran, TX; Master's work, Geology, University of Florida, Gainsville, FL. 5 1/2 years U.S.Geological Survey and 11 years BLM.
Timothy P. O'Brien	Supervisory Mineral Resource Specialist, Carlsbad Resource Area. Oversight and review of RMPA.	B.S., Range Management; B.S., Wildlife Management, Oregon State University, OR. 18 years BLM.
Jim Pettengill	Geologist, Roswell District Office. Impact Analysis and technical review.	B.S., Geology, Allegheny College, Neadville, PA; M.A., Geology, Northern Arizona University, Flagstaff, AZ. 10 years U.S. Geological Survey and 11 years BLM.
Scott Powers	Chief, Multi-Resource Staff, Carlsbad Resource Area. Oversight and review of the Carlsbad RMPA.	B.A., History, Sonoma State College, Rohnart Park, CA. 15 years BLM.
John T. Rakowski	Realty Specialist, Roswell District Office. Assisted in land descriptions, compiling isolated parcels, and reviewing master title plats for GIS mapping. Served as reviewer of realty data.	B.S., Earth Science, University of Minnesota, Minneapolis, MN. 29 years BLM.
George Ruebelmann	Archaeologist, Carlsbad Resource Area. Cultural resources for the Carlsbad area. Coordinated amendment to the Carlsbad Resource Management Plan, 1991-1992.	B.A., Anthropology, Idaho State University, Pocatello, ID. M.A., Anthropology, University of Idaho, Moscow, Idaho. 19 years BLM.
Adam Salameh	Petroleum Engineer, Carlsbad Resource Area. Fluid minerals review and RFD development.	B.S., Petroleum Engineering, Texas Tech University, Lubbock, TX. 4 years BLM.
John Sherman	Wildlife Management Biologist, Carlsbad Resource Area. Wildlife MSAs, alternatives, and maps for the Carlsbad RMPA.	B.S., Wildlife Science, B.S., Microbiology, Wildlife, and Pathology, New Mexico State University, Las Cruces, NM. 5 years BLM.
John Spain	Range Conservationist, Roswell District Office. Development and review of DPC.	B.S., Biology, Howard Payne University, Brownwood, TX; B.S., Range and Wildlife Management, Texas Tech University, Lubbock, TX. 1 year Forest Service; 15 years BLM.

TABLE 107 (Continued)

Name	BLM Position/RMP Responsibility	Education and Years of Experience
Support:		
Don Boyer	Environmental Protection Specialist, New Mexico State Office. NEPA Coordination	
Rena Gutierrez	Writer-Editor, Las Cruces District Office. Typesetting	
J.W. Whitney	Natural Resource Specialist, New Mexico State Office. Project Coordination.	

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Rand French, Pat Flanary, and Clark Taylor, all from the Roswell Resource Area

TABLE 108
CITIZEN WORK GROUP MEMBERSHIP

Name	Interest/Affiliation
	Carlsbad, February 18-19, 1993
Rick Bridges	Cave Management, related interests; self-employed
Steve Massey	Land use planning; Eddy County
Ray Miller	Oil and Gas; Marbob Energy Corporation
Scott Vail	Mining, environmental issues; IMC Fertilizer
Marvin Watts	Mining, ranching; Eddy Potash
Steve West	Environmental issues, wildlife management; Carlsbad High School
	Roswell, February 22-23, 1993
Jimmy Allison	Outdoor Recreation; Champion Outdoor Sports
Morton H. Appelbaum	Environmental issues; retired
Bill Ball	Renewable Resources, livestock grazing; self-employed
Walter S. Case	Mining; New Mexico Potash Corporation
Bud Eppers	Livestock grazing; self-employed
Toni Hall	Environmental issues, Nurse-Practitioner
John Montgomery	Cultural Resource Management; Eastern New Mexico University
	Roswell, February 25-26, 1993
C. Scott Bray	Transportation, Rights-of-Way; Arco Oil and Gas Company
Dorothy Griffiths	Cultural resources; Archeological Survey Consultants
Ben Hanson	Wildlife management, environmental education; NM Game and Fish Department
Felecia Harvey	Environmental Issues; Eastern New Mexico University
Jerry Don Martin	Outdoor Recreation, livestock grazing; self-employed
Ronald Mayer	Renewable Resources; self-employed
Randy Patterson	Oil and Gas; Yates Petroleum Corporation
Mike Pierce	People for the West, livestock grazing; self-employed
James Sciscenti	Cultural resources; Archeological Survey Consultants
Bob Unger	Oil and Gas; Marathon Oil Company

AGENCIES AND ORGANIZATIONS CONSULTED

Members of the RMP team have consulted formally or informally with numerous agencies, groups, and individuals during development of the plan. The following list is representative of the businesses, agencies, organizations, and individuals who have indicated an interest in the Roswell Resource Management Plan or Carlsbad Resource Management Plan Amendment and those who have been contacted during the planning process. This list is not all-inclusive. A complete list is on file in the Roswell Resource Area Office.

FEDERAL AGENCIES

U.S. Department of the Interior

Bureau of Indian Affairs
Bureau of Land Management
Bureau of Mines
  Branch of Mineral Assessment
  Intermountain Field Operation
Bureau of Reclamation
National Park Service
  Division of Environmental Compliance
  Carlsbad Caverns National Park
Natural Resource Library
Minerals Management Service
  Offshore Environmental Assessment Division
Office of Environmental Affairs
Office of Public Affairs
U.S. Fish and Wildlife Service
  Division of Environmental Coordination
U.S. Geological Survey
  Environmental Affairs Program

U.S. Department of Agriculture

Farmers Home Administration
U.S. Forest Service
  Lincoln National Forest
Soil Conservation Service

U.S. Department of Defense

Air Force
  Environment, Safety, Occupational Health
  Environmental Division
Army Corps of Engineers
  Planning Division, Southwestern Division

U.S. Department of Energy

Office of Environmental Compliance

U.S. Environmental Protection Agency

STATE OF NEW MEXICO

Brantley Lake State Park
Fort Stanton Hospital and Training School
Historic Preservation Division
Museum of New Mexico
Laboratory of Anthropology
Bureau of Mines and Mineral Resources
Department of Agriculture
Department of Game and Fish
Department of Energy, Minerals and Natural Resources
Environmental Improvement Division
Environmental Law Center
Forestry Division
Governor of New Mexico
Health and Environmental Department
Natural Heritage Program, UNM
Office of Cultural Affairs
Oil Conservation Division
State Engineer
  Interstate Stream Commission
State Highway and Transportation Department
State Land Office
State University
Water Quality Control Commission

U.S. FEDERAL ELECTED OFFICIALS

Congressman Joe Skeen
Senator Pete Domenici
Senator Jeff Bingaman

STATE ELECTED OFFICIALS

Representatives

Barbara A. Casey
Blake B. Curtis
Vincent Gallegos, Jr.
Paul Harrington

Richard T. Knowles
Robert S. Light
Vince Martinez
Richard E. Olson
Earlene Roberts
Joe M. Stell, Jr.
Mariano A. Torrez
David Townsend
John H. Underwood
Samuel F. Vigil, Jr.
Donald L. Whitaker
Robert P. Wallach
Kenneth E. Wallin

Senators

Pete Compos
Dianna J. Durand
Stuart Ingle
Timothy Z. Jennings
Don Kidd
Patrick H. Lyons
Billy J. McKibben
Cynthia Nava
Gary Don Reagan
Elizabeth T. Stefanics

LOCAL GOVERNMENTS

Mayors' Offices of:

Artesia
Carlsbad
Clovis
Dexter
Fort Sumner
Jal
Portales
Ruidoso
Santa Rosa
Tucumcari
Capitan
Carrizozo
Corona
Eunice
Hagerman
Lovington
Roswell
Ruidoso Downs
Tatum
Vaughn

County Commissions of:

Chaves
DeBaca
Guadalupe
Lincoln
Quay
Curry
Eddy
Lea
Otero
Roosevelt

INDUSTRY

Achen Oil and Gas Company
Alpha 21 Production Company
AMCO Production Company
Anadarko Petroleum Company
Anadarko Production Company
Arco Oil and Gas Company
Arrowhead Oil Corporation
Baber Well Servicing Company
Bass Enterprises Production Company
Beach Exploration Incorporated
Beard Oil Company
Bettis, Boyle and Stovall
Bird Creek Resources
Breck Operating Corporation
Brewer Oil Company
BTA Oil Producers
Burnett Oil Company, Incorporated
Caprock Sand and Gravel Company
Chevron USA Incorporated
Chi Operating Incorporated
Collins and Ware, Incorporated
Conoco Incorporation
Constructors Incorporated
CRI
Dames and Moore
Damson Oil Corporation
Dinero Operating Company
Eddy Potash Company
El Paso Natural Gas Company
Elliott Oil Company
Enron Corporation
Enron Oil and Gas Company
Exxon Company, USA
Exxon Corporation
Fina Oil and Chemical Company
Frostman Oil Corporation
Gas Company of New Mexico
General Operating Company
GPM Gas Corporation
Grace Energy
Great Western Drill Company
GRSJ Petroleum
H & S Oil Company
H.L. Brown, Jr. Oil Company
Hanagan Petroleum Corporation
Hanley Petroleum Incorporated
Hanson Energy

Heyco
Hondo Oil and Gas Company
Hudson and Hudson
IMC Fertilizer Company
J.T. Haile Petroleum, Ltd
J.D.R. Limited Oil Company
JEM Resources Incorporated
Kersey and Donohue
Koch Gatherings Systems, Incorporated
Kincaid and Watson Drilling Company
Larue and Muncy
Llano Incorporated
Mack Energy Corporation
Mallon Oil Company
Manzano Oil Corporation
Maralo Incorporated
Marathon Oil Company
Marbob Energy Corporation
McClellan Oil Corporation
McKay Oil Corporation
Meadco Properties Ltd.
Merit Energy Company
Mississippi Chemical Corporation
Mitchell Energy Corporation
Mobil Oil Corporation
Mobil Producing, Texas and New Mexico, Inc.
Moroil Company Incorporated
Murphy Operating Company
Myco Industries
Navajo Pipeline
Nearburg Producing Corporation
New Mexico Potash Corporation
New Tex Oil Company
Norwood Oil Company
Orla Petco Incorporated
Orxy Energy Company
Oxy USA, Incorporated
Pennzoil Company
Penroc Oil Company
Petroleum Development Corporation
Phillips Petroleum Company
POGP Producing Company
Premier Production Company
Ralph E. Williamson
Rose Gravel Company
Rowland Trucking Company
S & J Operating Company
Samedan Oil Corporation
Santa Fe Energy Company
Santa Fe Exploration Company
Shell Pipeline Corporation
Siete Oil and Gas Corporation
Socorro Petroleum Company
Snow Oil and Gas Incorporated
Southland Royalty Company
Texaco E&P, Incorporated.
Texas-New Mexico Pipeline Company
The Eastland Oil Company
Tierra Oil Company
Transwestern Pipeline Company
Ultramer Oil and Gas, Ltd.
Union Oil of California
Vintage Drilling Company
Vision Energy Incorporated
W.A. Moncrief Jr. Oil Company
Wallach Concrete
Walsh and Watts, Incorporated
WEK Drilling Company
Western Ag Minerals
Yates Drilling Company
Yates Energy Corporation
Yates Petroleum Corporation

ASSOCIATIONS AND INTEREST GROUPS

Agency for Conservation Archaeology
Albuquerque Public Library
Artesia Public Library
Audubon Society
Bar W. Ranch, Incorporated
Bikes Unlimited
Black Dot Ranch, Incorporated
Bikes Unlimited
Bogle Farms
Branigan Library, Las Cruces
Carlsbad Concerned Citizens for Responsible Land Management
Cave Research Foundation, Guadalupe Escarpment Area
Champion Outdoor Sports
Chaves County Wildlife Federation
Eddy County Cattle Growers
Eddy County Extension Service
Eunice Public Library
Federal Land Bank Association
Friends of Bats, New Mexico
Hobbs Quail Unlimited
Historic Preservation Division
International Mountain Bike Association
Jal Public Library
Lab of Anthropology
Lincoln County Heritage Trust
Lincoln Historic Preservation Board
Mariah Association

McNally, Incorporated
Mesilla Valley Fly Fisher
National Audubon Society
NSS, Southwestern Region
National Wildlife Federation, Rocky Mountain
National Resource Clinic
Nevada Outdoor Recreation and Association
Natural Resources Defense Council
New Mexico Farm and Livestock Bureau
New Mexico Oil and Gas Association
New Mexico Land Use Alliance
New Mexico Range Task Force
New Mexico Wildlife Federation
New Mexico Wool Growers, Incorporated
Outdoor Adventure
Outreach Adventures
Pecos Archaeological Consultants
People for the West
Quail Unlimited, Lea County Chapter
Quail Unlimited, Rio Hondo Chapter
Range Improvement Task Force
Roadrunner Ranches, Incorporated
Roswell Public Library
Roswell Roughriders
Roswell Schwinn Cyclery
Seven Rivers, Incorporated
Sierra Club, Albuquerque Chapter
Sierra Club, El Paso Chapter
Sierra Club, Rio Grande Chapter
Sierra Club, Southern New Mexico Group
Slash G Cattle Company
Society for Range Management
Southeastern New Mexico Grazing Association
Texas Tech, Department of Range and Wildlife
The Native Plant Society of New Mexico
The Nature Conservancy
The Wilderness Society
The Wildlife Society, New Mexico Chapter
Wildlife Federation
Wilderness Hikers
Wildlife Society
Zuni Archaeological Program

APPENDIXES

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APPENDIX 1
THE RMP PROCESS

This appendix describes the resource management plan development process.

Step 1. Identification of Issues

Step 1 is intended to identify resource management problems, conflicts, or opportunities that can be resolved through the planning process. These problems, conflicts or opportunities (issues) were identified through scoping. The BLM, public, other federal agencies, and state and local governments participated in the scoping process. Information from these sources was combined by the BLM into four general land-use planning issues and nine management concerns appropriate for resolution in the RMP/EIS process.

Step 2. Development of Planning Criteria

Step 2 involves development of criteria to identify the standards, guidelines, and constraints that would apply to the planning process. These criteria are the "sideboards" that were used by the specialists to focus their work on resolution of the issues and concerns. Early in the process decisions were made regarding the kinds of information needed to clarify the issues, the kinds of alternatives to be developed, and the factors to be considered in evaluating alternatives and selecting a preferred RMP/RMPA. As each issue or concern was identified, planning criteria were developed to help resolve the issues or concerns.

Step 3. Inventory Data and Information Collection

Step 3 involves the collection of various kinds of issue-related resource, environmental, social, and economic data. Data compiled in this step came primarily from literature reviews, consultation with professional staff in the BLM or other agencies, and review of existing data.

Step 4. Management Situation Analysis

Step 4 supports all the subsequent steps in planning. The Management Situation Analysis (MSA) is a detailed assessment of the current situation regarding management of the public lands. The result of this step is the development of an unpublished companion document to the RMP/EIS called the MSA. The MSA consists of four parts:

1. The physical profile describes each resource, the present demands on the resource, and the social and economic condition of the planning area. this section serves as the basis for the affected environment discussion.

2. Current management describes current management practices by resource and the status of on-going programs. This section serves as the basis for the description of the "no action" alternative and identifies the basis for the planning issues.

3. Implications of current management describes current conflicts or problems. This section relates to the discussion of the environmental consequences of the "no action" alternative.

4. The objectives and alternatives describe opportunities for the BLM to resolve the planning issues and to meet future needs. This section is the range of alternatives.

Step 5. Formulation of Alternatives

Five alternatives, which are described in Chapter 2, were formulated by an interdisciplinary team, with input from citizen advisory committees. Alternative A, the "no action" alternative, continues present management. Alternatives B, C, and D place emphasis on various levels of resource use and environmental protection. "Management Common to All Alternatives" is comprised of management that would be undertaken under any alternative. The preferred alternative is a combination of the four alternatives and "management common."

Step 6. Estimation of Effects of Alternatives

In Step 6, the physical, biological, economic, and social effects of implementing each alternative are assessed, to allow for a comparative evaluation of impacts. This step is the environmental impact analysis require by NEPA, and is presented in Chapter 4.

Step 7. Selection of the Preferred Alternative

Selection of the preferred management plan was based on public input and coordination, current BLM management policies and directions, and analysis of the impacts of each alternative. The Roswell District Manager, in conjunction with other BLM managers and staff, selected a combination of parts of the four alternatives plus "management common", because they believe this plan offers the best opportunity for balanced management and for resolving the issues and concerns identified during scoping. The preferred alternative is identified and analyzed in the Draft RMP/RMPA/EIS document, which is made available for public review and comment for 90 days.

Step 8. Selection of the Resource Management Plan

Based on the results of public review and comment, the Roswell District Manager will select a proposed RMP/RMPA and publish it with a final EIS. The selection and approval of the resource management plan is made after a 60-day Governor’s Consistency Review and a 30-day protest period on the proposed plan. Any person who participated in the planning process and who has an interest which is or may be adversely affected by adoption of the plan may protest its approval. A protest may raise only those issues which were submitted for the record during the planning process. After the decision on the proposed plan, an approved Roswell RMP and an approved Carlsbad RMPA, each with a Record of Decision, will be published.

Step 9. Monitoring and Evaluation

Step 9 involves monitoring the selected plan after it is implemented and evaluating the results of implementation. Data on long-term resource condition and trend will be collected and analyzed to determine the effectiveness of the plan in resolving the identified issues, and to ensure that implementation of the plan is achieving the desired results. Monitoring of the plan continues indefinitely from the time the RMP is implemented and may result in revisions of the whole plan or any portion of it as changing conditions dictate.

APPENDIX 2
WILD AND SCENIC RIVERS ANALYSIS

This appendix describes the inventory, analysis and conclusions on potential nominations to the national wild and scenic rivers system.

CRITERIA AND ANALYSIS FOR WILD AND SCENIC RIVER ELIGIBILITY

The summary of findings is in Table A2-1.

INVENTORY LIST

The following sources were used to develop the Roswell Resource Area inventory list.

- USDI, National Park Service, Nationwide Rivers Inventory list of 1982.
- American Rivers Outstanding Rivers List of 1988.
- Roswell District list.
- Professional knowledge of District and Area staff.

DETERMINATION OF ELIGIBILITY

A river as defined must be a flowing body of water or estuary; or section, portion, or tributary thereof, including rivers, streams, creeks and small lakes.

Dry washes which have flash flooding do not qualify and will not be considered.

Standing riparian areas do not qualify under the above definition and will not be considered.

Free-flowing is defined as an existing or flowing body of water, or estuary, or section, in a natural condition without impoundments, diversions, straightening, rip-rapping, or other modification of the waterway. The presence of impoundments above and/or below a river segment, or existing minor dams and diversion structures within a segment will not, of and by themselves, render a segment ineligible.

It must posses at least one outstandingly remarkable value that relates to the river. These values include scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values, such as paleontological, ecological, biological, botanical, hydrological, scientific, and research.

A river/stream segment must cross, at some point, lands administered by BLM. A segment will not be determined to be eligible for further study if the BLM does not have jurisdiction along at least some portion of the stream segment.

GUIDELINES FOR ASSESSING OUTSTANDINGLY REMARKABLE VALUES

Geographic Region of Consideration

All potential Outstandingly Remarkable Values were weighed against similar values throughout the region of consideration.

Outstandingly Remarkable Values Under Consideration

Scenic

The landscape elements of landform, vegetation, water, color, influence of adjacent scenery, scarcity, and cultural modifications are unique and harmonious. The rating area must be scenic quality "A" in VRM Class I or II in the Visual Resource Inventory Handbook, H-8410-1. Scenery and visual attractions should be highly diverse over the majority of the river or river segment length and not common to other rivers in the geographic region.

Recreation

Recreational opportunities are, or have the potential to be, unique enough to attract visitors from outside the geographic region. Visitors would be willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but not be limited to, sightseeing, wildlife observation, photography, hiking, fishing, hunting, and boating.

Interpretive opportunities should be exceptional and attract or have the potential to attract visitors from outside the geographic region.

Geologic

The river, or area within the river corridor, contains an example(s) of a geologic feature, process, or phenomena that is rare, unusual, one-of-a-kind, or unique to the geographic region. The feature(s) may be in an unusually active stage of development, represent a "textbook" example and/or represent a unique or rare combination of geologic features (erosional, volcanic, glacial, and other geologic structures).

Fish

Fish values may be judged on the relative merits of either fish populations or habitat, or a combination of the river-related conditions.

The river is nationally or regionally one of the top producers of resident and/or anadromous fish species. Of particular significance is the presence of populations of federally listed or candidate threatened and endangered species.

The river provides exceptionally high quality habitat for fish species indigenous to the region. Of particular significance is habitat for federally listed or candidate threatened and endangered species.

Wildlife

Wildlife values may be judged on the relative merits of either wildlife populations or habitat, or a combination of the following conditions.

The river, or area within the river corridor, contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique or populations of federally listed or candidate threatened and endangered species.

The river, or area within the river corridor, provides exceptionally high quality habitat for wildlife of national or regional significance, or may provide unique habitat or a critical link in habitat conditions for federally listed or candidate threatened and endangered species.

Historic

The river, or area within the river corridor, contains a site(s) or features(s) associated with a significant event, an important person, or a cultural activity of the past that was rare, unusual, or one-of-a-kind in the region. Of particular significance are sites or features listed in, or are eligible for inclusion in, the National Register of Historic Places.

Cultural

The river, or area within the river corridor, contains a site(s) where there is evidence of occupation or use by native Americans. Sites must be rare, one-of-a-kind, have unusual characteristics or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; or may have been used by cultural groups for rare or sacred purposes. The river or segment should be an integral part of the occupation and not just a coincidental occurrence.

Other Similar Values

No specific evaluation guidelines have been developed for the "other similar values" category. Additional river-related values include hydrologic, ecologic/biologic diversity, paleontologic, botanic, and scientific study opportunities.

TABLE A2 - 1
ELIGIBILITY ASSESSMENT FOR RIVERS IDENTIFIED FOR POSSIBLE INCLUSION AS COMPONENTS OF THE NATIONAL WILD AND SCENIC RIVER SYSTEM

River or Stream Segment	Total Length (Miles)	Free Flowing Values Yes/No	Outstandingly Remarkable Values	Eligibility Determination Eligible/Non-Eligible	Potential Classification W/S/R	Description of Values and Remarks
Rio Bonito	5.4	Y	None	non-eligible[1]	N/A	No identified Outstandingly Remarkable Values. Scenic Quality is Class A and VRM is Class II, but visual attractions are similar to other streams in the geographic area. Diversions and dams along this creek.
Salado Creek	2.0	N	None	non-eligible[2]	N/A	No Outstandingly Remarkable Values. There is one impoundment dam along this segment.
Hondo River	71.0	N	None	non-eligible	N/A	No Outstandingly Remarkable Values. Dams and diversions along this river.
Pecos River	112.0	Y	None	non-eligible[3]	N/A	No identified Outstandingly Remarkable Values. Scenic Quality is Class A and VRM is Class III, but visual attractions are similar to other streams in the geographic area.
Rio Felix	71.0	Y	None	non-eligible[4]	N/A	No Outstandingly Remarkable Values.

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[1] Survey of Rio Bonito within Fort Stanton.

[2] Survey of Salado Creek within Fort Stanton.

[3] Survey of the Pecos River includes Chaves County, only.

[4] Survey of the Rio Felix includes the segment of the river between the Pecos River and the Mescalero Apache Indian Reservation.

[5] The selection of these river segments for consideration was made by Roswell Resource Area staff following the review of information from the sources listed on page 1 of this Appendix.

APPENDIX 3
SURFACE USE AND OCCUPANCY REQUIREMENTS

This appendix describes, by alternative, surface disturbance mitigations intended to be applied prior to the initiation of any activity that would create surface disturbance.

The requirements listed below, under any alternative, would pertain to all activities conducted in the Roswell Resource Area. They would be applied primarily to the federal surface estate. However, in the case of oil and gas related activities, these standards could be applied to split estate in order to meet the requirements of federal law or with the concurrence of surface landowners.

In the Carlsbad Resource Area, these requirements would pertain only to oil and gas related activities. The standards would be applied primarily to the federal surface estate, but could be applied to split estate in order to meet the requirements of federal law or with the concurrence of surface landowners. It is expected that future amendments or revisions of the Carlsbad RMP will address the use of these requirements for other activities in the Carlsbad Resource Area.

The Surface Use and Occupancy Requirements identify buffers and other use standards around certain natural and man-made features to ensure protection of those features. Specific information on those features is maintained for review at the Roswell and Carlsbad Resource Area offices.

Tables A3-1 and A3-2, for the Carlsbad and Roswell Resource Areas, respectively, estimate the acreages affected by the Surface Use and Occupancy Requirements, under each alternative. These estimates reflect the maximum amount of acreage that could be affected and are for purposes of comparison and analysis, only. The most likely situation is that the requirements will cumulatively affect only a small area.

ALTERNATIVE B

- **Wildlife Habitat Projects:** No surface occupancy would be allowed within up to 400 meters of existing or planned wildlife habitat improvement projects. Large-scale vegetation manipulation projects such as prescribed burns would be excepted.

- **Raptor Nests and Heronries:** No surface occupancy would be allowed within up to 400 meters of active heronries or by delaying activity for up to 120 days, or a combination of both. Raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments would be protected by not allowing surface occupancy within up to 400 meters of nests or by delaying activity for up to 90 days, or a combination of both. Exceptions to this restriction for raptor nests would be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and would not result in continuing activity in proximity to the nest.

- **Slopes and Fragile Soils:** No occupancy or use would be allowed on slopes over 10 percent . Exceptions would be considered for authorized mineral material extraction sites and designated OHV areas, and for the installation of projects designed to enhance or protect renewable natural resources. Occupancy or use of fragile soils would be considered on a case-by-case basis.

TABLE A3-1
SUMMARY OF ESTIMATED ACREAGES AFFECTED BY SURFACE USE AND OCCUPANCY REQUIREMENTS
CARLSBAD RESOURCE AREA

FOR PURPOSES OF ANALYSIS ONLY

RESOURCE OR FEATURE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Wildlife Habitat Projects	5,400	14,010	5,400	5,400	5,400
Raptor Nests	85,376	336,168	85,376	85,376	85,376
Slopes (All Ownerships)	36,851	348,959	36,851	92,983	92,983
Streams, Rivers, Floodplains	65,600	98,400	32,800	65,600	65,600
Playa & Alkali Lakes	4,973	41,198	4,973	17,351	17,351
Spring, Seeps & Tanks					
Springs/Seeps	540	2,822	540	1,207	540
Tanks	8,800	27,800	8,800	8,800	8,800
Caves & Karst	55,610	73,880	55,610	55,610	55,610
Prairie Chickens (includes State lands)					
Timing requirements	195,462	460,700	162,822	460,700	460,700
Occupancy requirements	N/A	3,150	0	775	3,150
Dune Sagebrush Lizard (Potential Habitat)	N/A	480,000	480,000	480,000	480,000

Notes:

1. Figures under Alternative A represent acres affected by established restrictions or the acreage that could be affected by moves of up to 200 meters provided for by 43 CFR 3101.1-2.

2. For purposes of analysis, acreages under all alternatives represent the maximum number of acres affected by the requirements. Acreages actually affected when the requirements are applied will be substantially less than those listed.

3. Acreages are not additive, since many different features may occur in the same area (e.g., wildlife habitat projects, raptor nests, prairie chicken habitat and lizard habitat could all be in proximity). Adding columns amounts to double- or triple-counting (or more) of the same acreage.

4. For determining the effects of these requirements on oil and gas activity, the acreages are assumed to fall completely within areas of high hydrocarbon potential.

5. Acreages represent Federal surface only, unless noted.

6 Refer to Appendix 18 for explanations of the assumptions and processes used to compute these acreages.

TABLE A3-2
SUMMARY OF ESTIMATED ACREAGES AFFECTED BY SURFACE USE AND OCCUPANCY REQUIREMENTS
ROSWELL RESOURCE AREA

FOR PURPOSES OF ANALYSIS ONLY

RESOURCE OR FEATURE	ALTERNATIVE A (Current Management)	ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE E (Preferred)
Wildlife Habitat Projects	2,408	8,344	2,408	2,408	2,408
Raptor Nests	6,240	24,570	6,240	6,240	6,240
Slopes (All Ownerships)	N/A	825,150	109,618	260,023	260,023
Streams, Rivers, Floodplains	65,694	98,800	32,960	65,694	65,694
Playa & Alkali Lake	8,000	17,200	2,250	8,400	8,400
Spring, Seeps & Tanks					
Springs/Seeps	640	3,320	640	1,420	640
Tanks	8,800	27,800	8,800	8,800	8,800
Caves & Karst	27,690	42,410	26,363	26,136	26,136
Prairie Chickens					
Timing requirements	935,000	935,000	935,000	241,338	935,000
Occupancy requirements	N/A	6,400	0	6,400	6,400
Dune Sagebrush Lizard (Potential Habitat)	296,000	296,600	296,000	296,000	296,000

Notes:

1. Figures under Alternative A represent acres affected by established restrictions or the acreage that could be affected by moves of up to 200 meters provided for by 43 CFR 3101.1-2.
2. For purposes of analysis, acreages under all alternatives represent the maximum number of acres affected by the requirements. Acreages actually affected when the requirements are applied will be substantially less than those listed.
3. Acreages are not additive, since many different features may occur in the same area (e.g., wildlife habitat projects, raptor nests, prairie chicken habitat and lizard habitat could all be in proximity). Adding columns amounts to double-or triple-counting (or more) of the same acreage.
4. For determining the effects of these requirements on oil and gas activity, the acreages are assumed to fall completely within areas of high hydrocarbon potential.
5. Acreages represent Federal surface only, unless noted.
6. Refer to Appendix 18 for explanations of the assumptions and processes used to compute these acreages.

- **Streams, Rivers and Floodplains:** No surface occupancy would be allowed within up to 400 meters of the outer edge of 100-year floodplains, to protect riparian areas. An exception to this restriction may be considered based on the following criteria:

    - Additional development in areas with existing developments that have shown no adverse impacts to the riparian area as determined by the Authorized Officer, following a case-by-case review at the time of permitting.

    - Installation of habitat, rangeland or recreation projects designed to enhance or protect renewable natural resources.

- **Playas and Alkali Lakes:** No surface occupancy would be allowed within up to 400 meters of playas and alkali lakes. A waiver of this restriction would be considered for the installation of projects designed to enhance or protect renewable natural resources.

- **Springs, Seeps and Tanks:** No surface occupancy would be allowed within up to 400 meters of the source of a spring, or seep, nor within up to 200 meters on either side of downstream riparian areas created by flows from the source or resulting from riparian area management. No surface occupancy would be allowed within up to 400 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Waiver of this restriction would be considered for the installation of habitat or rangeland projects designed to protect or enhance the spring or seep, or downstream flows.

- **Caves and Karst:** No surface occupancy would be allowed within up to 400 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. No surface occupancy would be allowed within up to 200 meters of all other cave entrances, passages or aspects, or karst features, determined on a case-by-case basis at the time of permitting. A waiver of this restriction would be considered for the installation of projects designed to enhance or protect renewable natural resources.

- **Prairie Chickens, Roswell Resource Area**[1]: Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in Lesser Prairie Chicken habitat during the period of March 1 through June 30, each year. During that period, other activities, including the operation and maintenance of oil and gas facilities, would not be allowed between 3:00 a.m. and 9:00 a.m. Additionally, no new drilling would be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads would not be restricted. Exhaust noise from pump jack motors must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise. Exceptions to these restrictions would be considered for areas of no or low prairie chicken booming activity, as determined at the time of permitting.

- **Prairie Chickens, Carlsbad Resource Area:** Restrictions would be the same as those for the Roswell Resource Area, except that no new drilling would be allowed within up to 400 meters of active leks known at the time of permitting.

- **Dune Sagebrush Lizard:** Surface occupancy would not be allowed within up to 200 meters of suitable habitat. An exception to this restriction would be considered when an on-site evaluation of habitat suitability and extent, and analysis of the proposed surface use, indicate the proposal would not affect lizard populations.

- **Visual Resource Management:** Painting would be required of all permanent surface facilities or equipment approved by the BLM. Surface facilities or equipment includes such things as tank batteries, pump jacks and meter runs. Paint colors would be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. The selected paint color would match as closely as possible the predominant soil or vegetation color of the area. Low profile facilities may also be required, when needed, to reduce the contrast of a project with the dominant line and form of the surrounding landscape.

ALTERNATIVE C

- **Wildlife Habitat Projects:** No surface occupancy would be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects. Large-scale vegetation manipulation projects such as prescribed burns would be excepted. This restriction would be considered for waiver with appropriate off-site mitigation, as determined by the Authorized Officer.

- **Raptor Nests and Heronries:** No surface occupancy would be allowed within up to 200 meters of active heronries, or by delaying activity for up to 60 days, or a combination of both. Raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments would be protected by not allowing surface occupancy within up to 200 meters of nests or by delaying activity for up to 60 days, or a combination of both. Exceptions to this restriction for raptor nests would be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and would not result in continuing activity in proximity to the nest.

- **Slopes and Fragile Soils:** No occupancy or use would be allowed on slopes over 30 percent, except if a plan of operations and development which provides for adequate mitigation of impacts were approved by the Authorized Officer. Occupancy or use of fragile soils would be considered on a case-by-case basis.

- **Streams, Rivers and Floodplains:** Surface occupancy and use would be allowed within riparian areas, based on a plan of operation approved by the Authorized Officer.

- **Playas and Alkali Lakes:** No surface occupancy would be allowed within playas and alkali lakes. A waiver of this restriction would be considered for the installation of projects designed to enhance or protect renewable natural resources.

- **Springs, Seeps and Tanks:** No surface occupancy would be allowed within up to 200 meters of the source of a spring, or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management. No surface occupancy would be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Exceptions to this restriction would be considered for the installation of habitat or rangeland projects designed to enhance the spring or seep, or downstream flows.

- **Caves and Karst:** Surface use and occupancy would be controlled within up to 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. The appropriate surface use control would be determined on a case-by-case basis at the time of permitting.

- **Prairie Chickens:** Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in Lesser Prairie Chicken habitat during the period of April 1 through May 31, each year. During that period, other activities, including the operation and maintenance of oil and gas facilities, would not be allowed between 3:00 a.m. and 9:00 a.m. Normal vehicle use on existing roads would not be restricted. Exceptions to these restrictions would be considered for areas of no or low prairie chicken booming activity, as determined at the time of permitting.

- **Dune Sagebrush Lizard:** Suitable habitat would be avoided where possible. An on-site evaluation would be conducted on a case-by-case basis to consider relocation of the proposal of up to 200 meters, to avoid occupied areas.

- **Visual Resource Management:** Painting would be required of all permanent surface facilities or equipment approved by the BLM in Class II

Visual Resource Management zones. Painting of facilities or equipment also would be required in Class III VRM zones in the foreground view areas of paved roads, non-paved county roads, BLM back-country byways, and other areas determined by NEPA analysis to need painting to reduce visual impacts. Surface facilities or equipment includes such things as tank batteries, pump jacks and meter runs. The color 'Carlsbad Canyon' normally would be used. The use of one or more of the other nine standard environmental colors approved by the Rocky Mountain Coordinating Committee would be required if NEPA analysis determined the need to reduce visual impacts by painting.

ALTERNATIVE D

- **Wildlife Habitat Projects:** No surface occupancy would be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects. Large-scale vegetation manipulation projects such as prescribed burns would be excepted. This restriction would be considered for waiver with appropriate off-site mitigation, as determined by the Authorized Officer.

- **Raptor Nests and Heronries:** No surface occupancy would be allowed within up to 200 meters of active heronries or by delaying activity for up to 90 days, or a combination of both. Raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments, would be protected by not allowing surface occupancy within up to 200 meters of nests or by delaying activity for up to 90 days, or a combination of both. Exceptions to this restriction for raptor nests would be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and would not result in continuing activity in proximity to the nest.

- **Slopes or Fragile Soils:** No occupancy or use would be allowed on slopes over 20 percent. Exceptions would be considered for authorized mineral material extraction sites and designated OHV areas, and for the installation of projects designed to enhance or protect renewable natural resources. Occupancy or use of fragile soils would be considered on a case-by-case basis.

- **Streams, Rivers and Floodplains:** No surface occupancy would be allowed within floodplains or within up to 200 meters of the outer edge of 100-year floodplains, to protect riparian areas. An exception to this restriction may be considered based on the following criteria:

  - Additional development in areas with existing developments that have shown no adverse impacts to the riparian area as determined by the Authorized Officer, following a case-by-case review at the time of permitting.

  - Installation of habitat, rangeland or recreation projects designed to enhance or protect renewable natural resources.

  - Suitable off-site mitigation has been identified for habitat loss.

  - An approved plan of operations ensures the protection of water resources.

- **Playas and Alkali Lakes:** No surface occupancy would be allowed within up to 200 meters of playas or alkali lakes. Waiver of this restriction would be considered for projects designed to enhance or protect renewable natural resources. An exception for oil and gas development would be considered if playa lake loss was mitigated by the protection and development of another playa exhibiting the potential for improvement. Mitigation could include: installing fencing; developing a supplemental water supply; planting trees and shrubs for shelter belts; conducting playa basin excavation; constructing erosion control structures or cross dikes; or by improving the habitat in another area.

- **Springs, Seeps and Tanks:** No surface occupancy would be allowed within up to 200 meters of the source of a spring or seep, or within up to 200 meters on either side of downstream riparian areas created by flows from the source, or as a result of riparian area management. No surface occupancy would be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Exceptions to the restriction would be considered for the installation of habitat or rangeland projects designed to enhance the spring or seep, or downstream flows.

- **Caves and Karst:** No surface occupancy would be allowed within up to 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Waiver of this restriction would be considered for projects that enhance or protect renewable natural resource values.

- **Prairie Chickens:** Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in Lesser Prairie Chicken core habitat during the period of March 1 through May 31, each year. During that period, other activities, including the operation and maintenance of oil and gas facilities, would not be allowed during that period, between 3:00 a.m. and 9:00 a.m. No new drilling would be allowed in Lesser Prairie Chicken habitat within up to 200 meters of leks. Normal vehicle use on existing roads would not be restricted. Exhaust noise from pump jack motors must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise. Exceptions to these restrictions would be considered for areas of no or low prairie chicken booming activity, as determined at the time of permitting.

- **Dune Sagebrush Lizard:** Surface occupancy would not be allowed within up to 100 meters of "suitable habitat" in areas designated as "occupied habitat" through distributional studies. An exception to this restriction would be considered when an on-site evaluation of habitat extent, available species occurrence data, and the proposed surface use indicate the proposal would not affect lizard populations.

- **Visual Resource Management:** Painting would be required of all permanent surface facilities or equipment approved by the BLM in Class II Visual Resource Management zones. Painting of facilities or equipment also would be required in Class III VRM zones in the foreground view areas of paved roads, non-paved county roads, BLM back-country byways, and other areas determined by NEPA analysis to need painting to reduce visual impacts. Surface facilities or equipment includes such things as tank batteries, pump jacks and meter runs. Paint colors would be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. The selected paint color would match as closely as possible the predominant soil or vegetation color of the area. Low profile facilities may also be required in the zones described above, when needed, to reduce the contrast of a project with the dominant line and form of the surrounding landscape.

ALTERNATIVE E (PREFERRED ALTERNATIVE)

- **Wildlife Habitat Projects:** No surface occupancy would be allowed within up to 200 meters of existing or planned wildlife habitat improvement projects. Large-scale vegetation manipulation projects such as prescribed burns would be excepted. This restriction would be considered for waiver with appropriate off-site mitigation, as determined by the Authorized Officer.

- **Raptor Nests and Heronries:** No surface occupancy would be allowed within up to 200 meters of active heronries or by delaying activity for up to 120 days, or a combination of both. Raptor nests on special, natural habitat features, such as trees, large brush, cliff faces and escarpments, would be protected by not allowing surface occupancy within up to 200 meters of nests or by delaying activity for up to 90 days, or a combination of both. Exceptions to this restriction for raptor nests would be considered if the nests expected to be disturbed are inactive, the proposed activity is of short duration (e.g. habitat enhancement projects, fences, pipelines), and would not result in continuing activity in proximity to the nest.

- **Slopes or Fragile Soils:** No occupancy or use would be allowed on slopes over 20 percent. Exceptions would be considered for authorized mineral material extraction sites and designated OHV areas, for the installation of projects designed to enhance or protect renewable natural resources, or if a plan of operations and development which provides for adequate mitigation of impacts was approved by the Authorized Officer. Occupancy or use of fragile soils would be considered on a case-by-case basis.

- **Streams, Rivers and Floodplains:** No surface occupancy would be allowed within floodplains or within up to 200 meters of the outer edge of 100-year floodplains, to protect riparian areas. An exception to this restriction may be considered based on the following criteria:

  - Additional development in areas with existing developments that have shown no adverse impacts to the riparian area as determined by the Authorized Officer, following a case-by-case review at the time of permitting.

  - Installation of habitat, rangeland or recreation projects designed to enhance or protect renewable natural resources.

  - Suitable off-site mitigation has been identified for habitat loss.

  - An approved plan of operations ensures the protection of water resources.

- **Playas and Alkali Lakes:** No surface occupancy would be allowed within up to 200 meters of playas or alkali lakes. Waiver of this restriction would be considered for projects designed to enhance or protect renewable natural resources. An exception for oil and gas development would be considered if playa lake loss was mitigated by the protection and development of another playa exhibiting the potential for improvement. Mitigation could include: installing fencing; developing a supplemental water supply; planting trees and shrubs for shelter belts; conducting playa basin excavation; constructing erosion control structures or cross dikes; or by improving the habitat in another area.

- **Springs, Seeps and Tanks:** No surface occupancy would be allowed within up to 200 meters of the source of a spring or seep, or within downstream riparian areas created by flows from the source or resulting from riparian area management. No surface occupancy would be allowed within up to 200 meters of earthen tanks or the adjacent riparian areas created as a result of the presence of the tanks. Exceptions to this restriction would be considered for the installation of habitat or rangeland projects designed to enhance the spring or seep, or downstream flows.

- **Caves and Karst:** No surface occupancy would be allowed within up to 200 meters of known cave entrances, passages or aspects of significant caves, or significant karst features. Waiver of this restriction would be considered for projects that enhance or protect renewable natural resource values.

- **Prairie Chickens, Roswell Resource Area:** Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in Lesser Prairie Chicken habitat during the period of March 1 through June 30, each year. During that period, other activities, including the operation and maintenance of oil and gas facilities, would not be allowed between 3:00 a.m. and 9:00 a.m. Additionally, no new drilling would be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads would not be restricted. Exhaust noise from pump jack motors must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise. Exceptions to these restrictions would be considered for areas of no or low prairie chicken booming activity, as determined at the time of permitting.

- **Prairie Chickens, Carlsbad Resource Area:** Geophysical exploration operations, drilling for oil and gas, and other development would not be allowed in Lesser Prairie Chicken habitat during the period of April 1 through May 31, each year. During that period, other activities, including the operation and maintenance of oil and gas facilities, would not be allowed between 3:00 a.m. and 9:00 a.m. Additionally, no new drilling would be allowed within up to 400 meters of leks known at the time of permitting. Normal vehicle use on existing roads would not be restricted. Exhaust noise from pump jack motors must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise. Exceptions to these restrictions would be considered for areas of no or low prairie chicken booming activity, as determined at the time of permitting.

- **Dune Sagebrush Lizard:** Surface occupancy would not be allowed within up to 100 meters of "suitable habitat" in areas designated as "occupied habitat" through distributional studies. An exception to this restriction would be considered when an on-site evaluation of habitat extent, available species occurrence data, and the proposed surface use indicate the proposal would not affect lizard populations.

- **Visual Resource Management:** Painting would be required of all permanent surface facilities or equipment approved by the BLM. Surface facilities or equipment includes such things as tank batteries, pump jacks and meter runs. Paint colors would be selected from the ten standard environmental colors approved by the Rocky Mountain Coordinating Committee. The selected paint color would match as closely as possible the predominant soil or vegetation color of the area. Low profile facilities may also be required, when needed, to reduce the contrast of a project with the dominant line and form of the surrounding landscape.

REFERENCE ON PAGE AP3-4 1.In Alternatives B and E, surface use and occupancy requirements for prairie chicken habitat differ between the Roswell and Carlsbad resource areas. Characterizing the differences by resource area instead of by habitat difference, or some other measure, is a matter of convenience both for the BLM and industry. From a regional standpoint, the intensively managed prairie chicken habitat in the Carlsbad Resource Area falls primarily in highly developed oil fields. The intensively managed prairie chicken habitat in the Roswell Resource Area falls primarily in lightly developed oil fields. While the actual habitat is not substantially different between the resource areas, the activities occurring in that habitat vary significantly by resource area. Different management prescriptions are needed to address those activities.

APPENDIX 4
ROSWELL DISTRICT CONDITIONS OF APPROVAL

This appendix describes the standard conditions of approval that would be attached to use authorizations. The emphasis is primarily on oil and gas operations and rights-of-way, but these conditions may be applied to other activities, when needed. The conditions will be used by both resource areas.

GENERAL CONDITIONS OF APPROVAL

1. The holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this authorization.

2. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, *et. seq.*) with regard to any toxic substances that are used, generated by or stored on the pipeline route or on facilities authorized. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, *etc.*) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act, Section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.

3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, *et. seq.* or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, *et. seq.*) on this pipeline (unless the release or threatened release is wholly unrelated to the holder's activity on the pipeline). This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. If, during any phase of the construction, operation, maintenance, or termination of the authorization, any oil or other pollutant should be discharged, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil of other pollutant, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages to Federal lands resulting therefrom, the Authorized Officer may take such measures as deemed necessary to control and cleanup the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any liability or responsibility.

5. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on the holder's behalf, on public or Federal land shall be immediately reported to the Authorized Officer. The holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder shall be responsible for the cost of evaluation and any decision as to the proper mitigation measures will be made by the Authorized Officer after consulting with the holder.

6.The holder is hereby obligated to comply with procedures established in the Native American Graves Protection and Repatriation Act (NAGPRA) to protect such cultural items as human remains, associated funerary objects, sacred objects, and objects of cultural patrimony discovered inadvertently during the course of project implementation. In the event that any of the cultural items listed above are discovered during the course of project work, the proponent shall immediately halt the disturbance and contact the BLM within 24 hours for instructions. The proponent or initiator of any project shall be held responsible for protecting, evaluating, reporting, excavating, treating, and disposing of these cultural items according to the procedures established by the BLM in consultation with Indian Tribes."

7. The holder shall be responsible for weed control on disturbed areas within the limits of the site. The holder is responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods.

8. The holder shall be responsible for maintaining the site in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

PIPELINE (RIGHT-OF-WAY) (PERMIT) STIPULATIONS

9. The holder shall conduct all activities associated with the construction, operation, and termination of the pipeline within the authorized limits.

10. The pipeline shall be buried with a minimum cover of 36 inches between the top of the pipe and ground level.

11. Blading of all vegetation **shall/shall not** be allowed. Blading is defined as the complete removal of brush and ground vegetation. Clearing of brush species shall be allowed. Clearing is defined as the removal of brush while leaving ground vegetation (grasses, weeds, *etc.*) intact. Clearing is best accomplished by holding the blade 4 to 6 inches above the ground surface. In areas where blading and/or clearing is allowed, the maximum width of these operations shall not exceed ** feet.

12. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair
impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

13. Vegetation, soil, and rocks left as a result of construction or maintenance activity shall be randomly scattered over the project area and shall not be left in rows, piles, or berms, unless otherwise approved by the Authorized Officer. A berm shall be left over the ditch line to allow for settling back to grade.

14. The holder shall seed all surface disturbed by construction activities. Seeding shall be done according to the attached seeding requirements (Exhibit __), using the attached seed mixture (as determined by DPC).

15. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ____, Munsell Soil Color Chart Number ____.

16. The holder shall post signs designating the BLM serial number assigned to this authorization at the following locations: the points of origin and completion, or entry to and exit from public lands, of the pipeline and at all major road crossings. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.

17. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder shall take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

SURFACE INSTALLED PIPELINE

18. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec.**2803/2883**.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from fire or soil movement (including landslides and slumps as well as wind and water caused movement of particles) caused or substantially aggravated by any of the following within the permit area:

A. Activities of the holder, including but not limited to, construction, operation, maintenance, and termination of the facility.

B. Activities of other parties including but not limited to:
   (1). Land clearing.
   (2). Earth-disturbing and earth-moving work.
   (3). Blasting.
   (4). Vandalism and sabotage.

C. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars ($1,000,000) for any one event and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction of in which the damage of injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from the negligent acts of the United States.

19. The holder shall conduct all activities associated with the construction, operation, and termination of the pipeline within the authorized width of ** feet.

20. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.

21. The holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky or duney areas, the pipeline will be "snaked" around hummocks and dunes rather than suspended across these features.

22. The pipeline shall be buried a minimum of ** inches under all roads, including "two-tracks" and trails. Burial shall continue for 20 feet on each side of each crossing. The condition of the road, upon completion of the construction, shall be returned to at least its former state, with no bumps, dips, or soft spots remaining in the road surface.

23. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

24. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ____, Munsell Soil Color Chart Number___.

25. The holder shall post signs designating the BLM serial number assigned to this pipeline at the following locations: the points of origin and completion, or entry to and exit from public lands, of the pipeline and at all major road crossings. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.

26. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder shall take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

PERMANENT RESOURCE ROADS

27. ROAD WIDTH AND GRADE

The road will have a driving surface of __ feet (all roads shall have a minimum driving surface of __ feet, unless local conditions dictate a different width). The maximum grade is 10 percent unless the box below is checked. Maximum width of surface disturbance from construction will be __ feet.

☐ Those segments of road where grade is in excess of 10% for more than 300 feet shall be designed by a professional engineer.

28. CROWNING AND DITCHING

Crowning with materials on site and ditching on one side of the road on the uphill side will be required. The road cross-section will conform to the cross section diagrams in Figure 1. If conditions dictate, ditching may be required for both sides of the road; if local conditions permit, a flat-bladed road may be considered (if these conditions exist, check the appropriate box below). The crown shall have a grade of approximately 2% (i.e., 1" crown on a 14' wide road).

☐ Ditching will be required on both sides of the roadway as shown on the attached map or as staked in the field.

☐ Flat-blading is authorized on segment(s) delineated on the attached map.

29. DRAINAGE

Drainage control shall be ensured over the entire road through the use of borrow ditches, outsloping, insloping, natural rolling topography, lead-off (turnout) ditches, culverts, and/or drainage dips.

A. All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval for lead-off ditches shall be determined according to the following table, but may be amended depending upon existing soil types and centerline road slope (in %):

SPACING INTERVAL FOR TURNOUT DITCHES

Percent slope	Spacing interval
0% - 4%	400' - 150'
4% - 6%	250' - 125'
6% - 8%	200' - 100'
8% - 10%	150' - 75'

A typical lead-off ditch has a minimum depth of 1 foot below and a berm 6 inches above natural ground level. The berm will be on the down-slope side of the lead-off ditch. The ditch end will tie into vegetation whenever possible.

For this road the spacing interval for lead-off ditches shall be at

☐ 400 foot intervals.

☐ ____ foot intervals.

☐ locations staked in the field as per spacing intervals above.

☐ locations delineated on the attached map.

B. Culvert pipes shall be used for cross drains where drainage dips or low water crossings are not feasible. The minimum culvert diameter must be 18 inches. Any culvert pipe installed shall be of sufficient diameter to pass the anticipated flow of water. Culvert location and required diameter are shown on the attached map (Further details can be obtained from the Roswell District Office or the appropriate Resource Area Office).

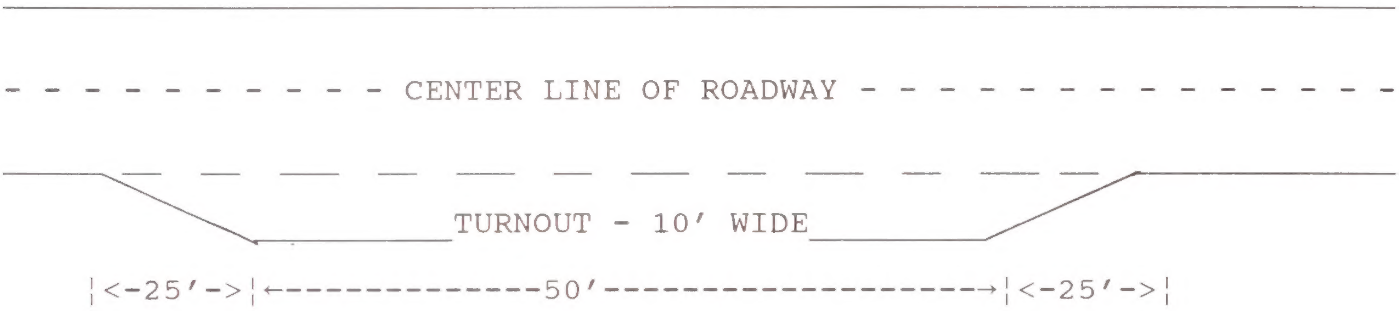
C. On road slopes exceeding 2%, drainage dips shall drain water into an adjacent lead-off ditch. Drainage dip location and spacing shall be determined by the formula:

$$\text{spacing interval} = \frac{400'}{\text{road slope in \%}} + 100'$$

Example: 4% slope: $\text{spacing interval} = \frac{400}{4} + 100 = 200$ feet

30. TURNOUTS

Unless otherwise approved by the Authorized Officer, vehicle turnouts will be required. Turnouts will be located at 2000-foot intervals, or the turnouts will be intervisible, whichever is less. Turnouts will conform to the following diagram:



STANDARD TURNOUT - PLAN VIEW

31. SURFACING

Surfacing of the road or those portions identified on the attached map may, at the direction of the Authorized Officer, be required, if necessary, to maintain traffic within the right-of-way with caliche, gravel, or other surfacing material which shall be approved by the Authorized Officer. When surfacing is required, surfacing materials will be compacted to a minimum thickness of six inches with caliche material. The width of surfacing shall be no less than the driving surface. Prior to using any mineral materials from an existing or proposed Federal source, authorization must be obtained from the Authorized Officer.

32. CATTLEGUARDS

Where used, all cattleguard grids and foundation designs and construction shall meet the American Association of State Highway and Transportation Officials (AASHTO) Load Rating H-20, although AASHTO U-80 rated grids shall be required where heavy loads (exceeding H-20 loading), are anticipated (See BLM standard drawings for cattleguards). Cattleguard grid length shall not be less than 8 feet and width of not less than 14 feet. A wire gate (16-foot minimum width) will be provided on one side of the cattleguard unless requested otherwise by the surface user.

33. MAINTENANCE

A. The holder shall maintain the road in a safe, usable condition. A maintenance program shall include, but not be limited to blading, ditching, culvert installation, culvert cleaning, drainage installation, cattleguard maintenance, and surfacing.

B. Failure of the holder to share maintenance costs in dollars, equipment, materials, or manpower proportionate to the holders use with other authorized users may be adequate grounds to terminate the authorization. The determination as to whether this has occurred and the decision to terminate shall rest with the Authorized Officer. Upon request, the Authorized Officer shall be provided with copies of any maintenance agreement entered into.

34. PUBLIC ACCESS

Public access along this road will not be restricted by the holder without specific written approval being granted by the Authorized Officer. Gates or cattleguards on public lands will not be locked or closed to public use unless closure is specifically determined to be necessary and is authorized in writing by the Authorized Officer.

35. ROAD REHABILITATION SPECIFICATIONS

When the road is abandoned, it will be ripped at least sixteen inches deep, including turnouts. The caliche may be reclaimed for re-use before ripping, if so desired. Alternately, the caliche can be plowed under with a grader, or other soil turning device, and the plowed surface disked before seeding. All culverts or other structures will be removed. All fill material will be replaced into the cut areas; barrow and lead-off ditches, drainage dips, or other erosion control earthwork will be filled or smoothed; and the abandoned road returned to the natural contours, as closely as possible. Water breaks at least eight inches high will be constructed as shown on accompanying Illustration Sheet. Traffic barriers will be installed at all vehicular access points to prevent further use of the road.

Reseed the entire area with the following mixture (to be determined by DPC).

All disturbed areas are to be seeded with the seed mixture listed above. The seed and any fertilizer involved are to be applied together by broadcasting with a seed spreader, then harrowed for seed coverage. Use of a seed drill is acceptable. Appropriate measures will be taken to ensure that the seed/fertilizer mixture is evenly and uniformly planted. There will be no primary or secondary noxious weeds in the seed mixture. Seed will be tested for viability and purity in accordance with State law(s) within nine months prior to purchase. Commercial seed will be either certified or registered and the seed mixture container will be tagged in accordance with State law(s). The seed will be available for inspection by the Authorized Officer. The seeding will be repeated until a satisfactory stand is established as determined by the Authorized Officer. Evaluation of growth will not be made before completion of the first growing season after seeding.

Normally, the best time for seeding is between June 15 and September 15. However, the grantee may reseed immediately after completing surface abandonment procedures. In any event, the BLM reserves the right to require reseeding at a specific time if seed does not germinate after one complete growing season.

Contact the appropriate resource area office (Phone No.) at least two working days before the start of reseeding activities or if there are any questions.

OVERHEAD ELECTRIC DISTRIBUTION LINES

36. The holder shall conduct all activities associated with the construction, operation, and termination of the powerline within the authorized limits.

37. No blading or clearing of any vegetation will be allowed unless approved in writing by the Authorized Officer.

38. Powerlines shall be constructed to standards outlined in "Suggested Practices for Raptor Protection on Powerlines," Raptor Research Foundation, Inc., 1981, unless otherwise agreed to by the Authorized Officer in writing.

The holder shall assume the burden and expense of proving that pole designs not shown in the above publication are "eagle safe." Such proof shall be provided by a raptor expert approved by the Authorized Officer. The BLM reserves the right to require modifications or additions to all power line structures placed this authorization, should they be necessary to ensure the safety of large perching birds. Such modification and/or additions shall be made by the holder without liability or expense to the United States.

39. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair
impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence will be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

40. Construction holes left open over night shall be covered. Covers shall be secured in place and shall be strong enough to prevent livestock or wildlife from falling through and into a hole.

41. The holder shall evenly spread the excess soil excavated from pole holes in the immediate vicinity of the pole structure.

42. The BLM serial number assigned to this authorization grant shall be posted in a permanent, conspicuous manner, and be maintained in a legible condition for the term of the authorization at all major road crossings and at all serviced facilities. Numbers will be at least two inches high and will be affixed to the pole nearest the road crossing and at the facilities served.

43. Upon cancellation, relinquishment, or expiration of this grant, the holder shall comply with those abandonment procedures as prescribed by the Authorized Officer.

44. All surface structures (poles, lines, transformers, *etc.*) shall be removed within _______ days of abandonment, relinquishment, or termination of use of the serviced facilities or within _______ days of abandonment, relinquishment, or termination of this authorization, whichever comes first. This will not apply where the powerline extends to serve an active, adjoining facility or facilities.

COMMUNICATION SITES

45. The authorization is conditioned upon the submission of a copy of an approved license and/or renewal license granted by the Federal Communications Commission (FCC) or the Interdepartmental Radio Advisory Committee (IRAC) for each electronic station installation authorized or future amendments of this authorization. A copy of the FCC or IRAC authorization shall be submitted within 90 days of issuance of this authorization or within 90 days following approval of an amendment to this authorization. Failure to submit the FCC or IRAC authorization copy within the time specified shall be grounds for termination of this authorization or cancellation of an amendment to this authorization. The Authorized Officer may grant an extension of up to 90 days, if requested in writing by the holder.

46. The holder and its subleases shall at all times operate their radio-electronic equipment in such a manner as not to cause interference with radio-electronic operations of existing users in the vicinity. If such interference results from holder’s or sublessee’s operations, holder shall promptly, at its own expense, modify the equipment and operations, or shut down if necessary to eliminate or reduce the interference to the satisfaction of the FCC, IRAC, and/or the Authorized Officer.

47. The holder shall notify the Authorized Officer of any intent to locate additional users within or upon their existing, not less than 45 days prior to occupancy of holder’s facilities. Information that must be included is:

a. Name, current address, and phone number of the third party user(s).

b. Expected date of occupancy.

c. A photo or sketch of the type of antennas to be installed, as well as any other planned physical changes to the exterior facilities operated by the holder. If the proposed use is not specified in the original authorization shall be required.

48. No less than 45 days prior to occupancy of the holder's facility, the holder shall notify existing users within a 1-mile radius that the holder intends to accommodate a new communication user in its facility. Existing users can then file any comments pertaining to potential frequency or electromagnetic problems with the Federal Communications Commission, 1919 M Street NW, Washington, DC 20554, with a copy to the Authorized Officer.

49. The holder shall be responsible for the actions and operations of any third party users associated with this facility. All such use shall be subject to the applicable terms, conditions, and stipulations of this authorization.

50. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ____, Munsell Soil Color Chart Number ___.

51. The holder shall post signs designating the BLM serial number assigned to this facility at the points of entry to and exit from the site. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.

52. The holder agrees to share road maintenance costs with all present and future users of the access road. At such future time as a Users Association for this communication site is formed, the holder shall join the Users Association and remain a member in good standing. Within 30 days of the creation of such Users Association the holder shall provide the authorized officer with evidence of membership. Failure of the holder to join the Users Association and remain a member in good standing shall constitute sufficient grounds for termination of this authorization.

OIL AND GAS RELATED SITES (RIGHT-OF-WAY)

53. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ____, Munsell Soil Color Chart Number ___.

54. The holder shall post a sign designating the BLM serial number assigned to this authorization in a permanent, conspicuous location on the site where the sign will be visible from the entry to the site. This sign will be maintained in a legible condition for the term of the authorization.

SALTWATER DISPOSAL WELLS (COMMERCIAL)

55. This permit is subject to all terms, conditions, and stipulations of the NMOCD approval and applicable Roswell District General Requirements for Oil and Gas Operations on Federal Leases (copy attached).

56. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR

Sec.**2803/2883**.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from fire or soil movement (including landslides and slumps as well as wind and water caused movement of particles) caused or substantially aggravated by any of the following within the authorized site or facilities:

A. Activities of the holder, including but not limited to, construction, operation, maintenance, and termination of the facility.

B. Activities of other parties including but not limited to:

(1). Land clearing.
(2). Earth-disturbing and earth-moving work.
(3). Blasting.
(4). Vandalism and sabotage.

The maximum limitation for such strict liability damages shall not exceed one million dollars ($1,000,000) for any one event and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction of in which the damage of injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from the negligent acts of the United States.

57. As a guarantee of faithful performance of the provisions of this grant, the holder agrees to deliver and maintain a surety bond, or other performance security acceptable to the Authorized Officer, in the amount of twenty-five thousand dollars ($25,000.00). Should the sureties or bonds delivered under this grant become unsatisfactory to the Bureau, the holder shall, within thirty (30) days of demand, furnish a new bond, or other acceptable security, with surety.

The holder may deposit in a Federal depositor as directed by the Bureau, and maintain therein, cash in the amounts provided for above or negotiable securities of the United States having a market value at the time of deposit of not less than the dollar amounts provided for above.

58. The holder agrees to secure the prior approval of the Authorized Officer before commencing any operations such as: drilling out cement plugs, cementing operations, perforating (using explosive or hydraulic fracturing), deepening, altering or pulling a portion of the well's casing, plugging operations, or any other operation affecting the well.

59. The holder agrees to use the well solely for salt water disposal. No other substance–including oil, condensates, sludge, drilling fluids, other chemicals, or any toxic pollutant (as this term is defined under the Clean Water Act 40 CFR 104-149, Section 502)–shall be injected.

60. At any time deemed necessary by the Authorized Officer, earthen dikes shall be constructed and maintained around all tanks, vessels, and storage facilities. These dikes will be designed to contain at least 150 percent of the contents of the facility.

61. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ____, Munsell Soil Color Chart Number____.

62. The holder shall post a sign in a permanent, conspicuous location at the site. At a minimum, the sign will state the holder's name, the well name, the BLM serial number, and the legal location by township, range, and quarter-quarter of section. The sign will be maintained in a legible condition for the term of the authorization.

63. Upon cancellation, relinquishment, or expiration of this authorization, the holder shall comply with those abandonment procedures, including restoration and decontamination (if necessary) of the surface and plugging of the well bore, as prescribed by the Authorized Officer.

Buried Telephone Cables

64. The holder shall conduct all activities associated with the construction, operation, and termination of the telephone line within the authorized limits.
65. There shall be no clearing or blading of the telephone route unless otherwise agreed to in writing by the Authorized Officer.

66. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair
impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

67. Vegetation, soil, and rocks left as a result of construction, drilling, or maintenance activity shall be randomly scattered over the project area and shall not be left in rows, piles, or berms, unless otherwise approved by the authorized officer. A berm shall be left over the ditch line to allow for settling back to grade.

68. The holder shall post signs designating the BLM serial number assigned to this authorization at the following locations: the points of origin and completion, or entry to and exit from public lands, of the telephone line and at all major road crossings. These signs shall be posted in a permanent, conspicuous manner, and shall be maintained in a legible condition for the term of the authorization.

69. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ____, Munsell Soil Color Chart Number____.

70. The holder shall not use the telephone cable route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder shall take whatever steps are necessary to ensure that the telephone cable route is not used as a roadway.

CATHODIC PROTECTION SITES

71. Unless otherwise approved, in writing, by the Authorized Officer, the holder shall reseed all surface disturbed by construction activities. If reseeding is required, it will be done according the attached seeding requirements (Exhibit), using seed mixture as determined by DPC.

72. All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is ______ Munsell Soil Color Chart Number____.

73. The holder shall post a sign designating the BLM serial number assigned to this authorization and the holder's name at the site. This sign will be posted in a permanent, conspicuous manner, and will be maintained in a legible condition for the term of the authorization.

APPLICATION FOR PERMIT TO DRILL

74. The operator shall post signs identifying the location permitted herein in accordance with the requirements contained On Shore Oil and Gas Order #1 and 43 CFR 3162.6.

THE FOLLOWING DATA IS REQUIRED ON THE WELL SIGN:

(example) OPERATORS NAME: XYZ Oil & Gas Company
WELL NAME & NO: #1 XYZ Federal
LEASE NO.: NM-XXXXX
LOCATION: XX' FXL & XX' FXL - Sec. XX, T. XX S., R. XX E.,
COUNTY: XXXXXX.

On Lease - Surface Requirements Prior to Drilling:

75. The approval of this action does not in any way grant or imply approval of any off-lease or off-unit action. It is the responsibility of the applicant to obtain any such approvals from the appropriate surface managing agency, including the B.L.M., and/or any private landowners.

76. The BLM will monitor construction on this drill site. Notify the appropriate Resource Area Office, BLM at least (specify) working days prior to commencing construction at (505) ________.

77. Prior to commencing construction of the road, pad, or other associated developments, the operator shall provide the dirt contractor with a copy of the approved Surface Use Plan and the attached Conditions of Approval.

78. All vehicles and equipment associated with drilling, completion, or production phases of this well shall be confined to the approved road, pad, and other areas herein approved.

79. All topsoil and vegetation encountered during the construction of the drill site areas shall be stockpiled and made available for resurfacing of the disturbed areas after completion of the drilling operations. Topsoil on the (well name and number) is approximately (specify) inches in depth. A minimum of approximately (specify) _ cubic yards of topsoil material shall be stockpiled on the (specify) edge / at the (specify) corner of the location for reclamation of the pad and pit area.

80. The drill pad and access road for this well must be surfaced with (specify) inches of compacted gravel/caliche.

81. Caliche, gravel, or other related materials from new or existing pits on Federal mineral estate shall not be taken without prior approval from the authorized officer.

82. Payment for Federal mineral materials used for construction is required prior to construction of the pad and access road.

83. Drilling Pits:

A. Reserve pits shall be constructed such that at least one half the total pit volume is below natural ground level (minimum of 4 feet) unless approved by the authorized officer or a metal closed pit system is used. All mud pits shall be constructed so as not to leak, break, or allow discharge of liquids. Pits are not to be located in any natural drainage. Any plastic material used to line pits, must be at least __ mil in thickness, have a bursting strength of ___ PSI, and be removed to below ground level before the pits are covered.

B. Reserve pits shall be fenced on three sides during drilling operations. The fourth side shall be fenced immediately upon rig release. Any unguarded pit or open top tank containing oil and/or toxic liquids shall be covered with a fine mesh netting to protect wildlife, particularly migratory waterfowl.

C. Liquids in pits will be allowed to evaporate, or be properly disposed of otherwise, before pits are reclaimed. Under no circumstances shall pits be cut to be drained.

84. Other:

A. Tank batteries shall have a berm constructed around them, 24" high and of sufficient dimensions to contain the contents of the largest tank enclosed.

85. Cave Stipulations:

A. If, during any construction activities any sinkholes or cave openings are discovered, all construction activities shall immediately cease, and the BLM office will be notified.

B. The BLM will, within 24 hours of notification in "A" above, conduct an on the ground Karst field inspection. At the field inspection the authorized field inspector will authorize or suggest mitigating measures to lessen the damage to the karst environment. A verbal order to proceed or stop the operation will be issued at that time.

86. Painting Stipulations:

All above-ground structures not subject to safety requirements shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" designated by the Rocky Mountain Five-State Interagency Committee. The color selected for this project is _ _, Munsell Soil Color Chart Number ___.

87. Fences:

The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

Well Completion Requirements:

88. Surface Restoration. If the well is a producer, the reserve pit(s) shall be backfilled when dry, and cut-and-fill slopes shall be reduced to a slope of 3:1 or less. All areas of the pad not necessary for production must be re-contoured to resemble the original contours of the surrounding terrain, and topsoil must be

re-distributed and the reclaimed area re-seeded. Seeding shall be done according to the attached seeding requirements (Exhibit B), using the attached seed mixture (as determined by DPC).

Bird/Bat Protection:

89. All vertical open-vent exhaust stacks from units associated with existing production equipment shall be modified to prevent birds and bats from entering them and to the extent practical to discourage perching and nesting. This can be accomplished by attaching a conical-shaped expanded steel cone with at least a 70-degree pitch. This will prevent birds from perching and/or building a nest on the open-vent exhaust stack.

New production equipment installed on federal leases after November 1, 1993, will have the open-vent exhaust stacks construct to prevent the entry of birds and bats and to the extent practical to discourage perching and nesting.

Abandonment:

90. If the well is dry and is to be plugged, approval of the proposed plugging program may be obtained verbally. However, verbal approval must be confirmed in writing by immediately filing an original and six copies of the Notice of Intention to abandon on Form 3160-5 with the appropriate BLM area office. The report should show the total depth reached, the reason for plugging, and the proposed intervals, by depths, where plugs are to be placed, type of plug, type of plugging mud, etc.

91. Following receipt of "Subsequent Report of Abandon", final BLM requirements for surface reclamation will be specified by the approving BLM office.

92. If the well is not drilled, please notify the BLM so that an official release can be approved.

Mineral Material Sites

93. All design, material, and construction, operation, maintenance, and termination practices shall be in accordance with safe and proven engineering practices.

94. The holder shall conduct all activities associated with the construction, operation, and termination of the material pit within the authorized limits.

95. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair
impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

96. The holder shall be responsible for the actions and operations of any third party users associated with this authorization. All such use shall be subject to the applicable terms, conditions, and stipulations of this authorization.

97. The road proposed as part of this authorization shall be constructed and maintained in accordance with the BLM standards prescribed for a roads and the New Mexico Roads Policy.

98. The holder shall seed all surface disturbed by construction activities. Seeding shall be done according to

the attached seeding requirements (Exhibit __), using the attached seed mixture (as determined by DPC).

99. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles (within the material site) (at the following staked locations: (designate).) topsoil shall be stripped to an average depth of (designate) inches. A total of (designate) cubic yards of topsoil shall be stockpiled.

100. Excess excavated, unsuitable, or slide material shall be disposed of as directed by the authorized officer.

101. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of (designate) inches deep, the soil shall be deemed too wet to adequately support construction equipment.

102. Existing roads and trails on public lands that are blocked as the result of the material pit activities shall be rerouted or rebuilt as directed by the authorized officer.

103. The holder shall recontour the disturbed area and obliterate all earthwork by removing embankments, backfilling excavations, and grading to reestablish the approximate original contour of the land as determined by the authorized officer.

104. The holder shall uniformly spread topsoil over all unoccupied disturbed areas. Spreading shall not be done when the ground or topsoil is frozen or wet.

105. The BLM will monitor construction on this material pit site. Notify the appropriate Resource Area Office, BLM at least __(specify)__ working days prior to commencing excavation at (505) ________.

FILMING PERMITS

106. All vehicular traffic shall be confined to existing roads.

107. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.

108. Upon cancellation, relinquishment, or expiration of this authorization, the holder shall comply with rehabilitation procedures prescribed by the Authorized Officer.

109. The holder shall notify the Authorized Officer upon completion of operations so that a compliance check can be conducted.

110. Acknowledgment, through the film credits, shall be given to: the U.S. Department of Interior, Bureau of Land Management, Roswell Resource Area.

111. The permittee shall provide the BLM with proof of an insurance policy, naming the Bureau of Land Management as "additionally insured" or "co-insured".

112. The permittee shall provide the appropriate resource area office with a copy of the finished film product within two weeks of public distribution.

re-distributed and the reclaimed area re-seeded. Seeding shall be done according to the attached seeding requirements (Exhibit B), using the attached seed mixture (as determined by DPC).

Bird/Bat Protection:

89. All vertical open-vent exhaust stacks from units associated with existing production equipment shall be modified to prevent birds and bats from entering them and to the extent practical to discourage perching and nesting. This can be accomplished by attaching a conical-shaped expanded steel cone with at least a 70-degree pitch. This will prevent birds from perching and/or building a nest on the open-vent exhaust stack.

New production equipment installed on federal leases after November 1, 1993, will have the open-vent exhaust stacks construct to prevent the entry of birds and bats and to the extent practical to discourage perching and nesting.

Abandonment:

90. If the well is dry and is to be plugged, approval of the proposed plugging program may be obtained verbally. However, verbal approval must be confirmed in writing by immediately filing an original and six copies of the Notice of Intention to abandon on Form 3160-5 with the appropriate BLM area office. The report should show the total depth reached, the reason for plugging, and the proposed intervals, by depths, where plugs are to be placed, type of plug, type of plugging mud, etc.

91. Following receipt of "Subsequent Report of Abandon", final BLM requirements for surface reclamation will be specified by the approving BLM office.

92. If the well is not drilled, please notify the BLM so that an official release can be approved.

Mineral Material Sites

93. All design, material, and construction, operation, maintenance, and termination practices shall be in accordance with safe and proven engineering practices.

94. The holder shall conduct all activities associated with the construction, operation, and termination of the material pit within the authorized limits.

95. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair
impacted improvements to at least their former state. The holder shall contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates shall be allowed unless approved by the Authorized Officer.

96. The holder shall be responsible for the actions and operations of any third party users associated with this authorization. All such use shall be subject to the applicable terms, conditions, and stipulations of this authorization.

97. The road proposed as part of this authorization shall be constructed and maintained in accordance with the BLM standards prescribed for a roads and the New Mexico Roads Policy.

98. The holder shall seed all surface disturbed by construction activities. Seeding shall be done according to

the attached seeding requirements (Exhibit __), using the attached seed mixture (as determined by DPC).

99. Suitable topsoil material removed in conjunction with clearing and stripping shall be conserved in stockpiles (within the material site) (at the following staked locations: (designate).) topsoil shall be stripped to an average depth of (designate) inches. A total of (designate) cubic yards of topsoil shall be stockpiled.

100. Excess excavated, unsuitable, or slide material shall be disposed of as directed by the authorized officer.

101. No construction or routine maintenance activities shall be performed during periods when the soil is too wet to adequately support construction equipment. If such equipment creates ruts in excess of (designate) inches deep, the soil shall be deemed too wet to adequately support construction equipment.

102. Existing roads and trails on public lands that are blocked as the result of the material pit activities shall be rerouted or rebuilt as directed by the authorized officer.

103. The holder shall recontour the disturbed area and obliterate all earthwork by removing embankments, backfilling excavations, and grading to reestablish the approximate original contour of the land as determined by the authorized officer.

104. The holder shall uniformly spread topsoil over all unoccupied disturbed areas. Spreading shall not be done when the ground or topsoil is frozen or wet.

105. The BLM will monitor construction on this material pit site. Notify the appropriate Resource Area Office, BLM at least __(specify)__ working days prior to commencing excavation at (505) ________.

FILMING PERMITS

106. All vehicular traffic shall be confined to existing roads.

107. No blading or clearing of any vegetation shall be allowed unless approved in writing by the Authorized Officer.

108. Upon cancellation, relinquishment, or expiration of this authorization, the holder shall comply with rehabilitation procedures prescribed by the Authorized Officer.

109. The holder shall notify the Authorized Officer upon completion of operations so that a compliance check can be conducted.

110. Acknowledgment, through the film credits, shall be given to: the U.S. Department of Interior, Bureau of Land Management, Roswell Resource Area.

111. The permittee shall provide the BLM with proof of an insurance policy, naming the Bureau of Land Management as "additionally insured" or "co-insured".

112. The permittee shall provide the appropriate resource area office with a copy of the finished film product within two weeks of public distribution.

APPENDIX 5
PRACTICES FOR OIL AND GAS DRILLING AND OPERATIONS IN CAVE AND KARST AREAS

This appendix describes, by alternative, practices for detecting and avoiding cave and karst areas with respect to oil and gas drilling, and for mitigating impacts to caves and karst when they cannot be avoided. These mitigations are predicated on the BLM's responsibilities for resource management and protection derived from the Federal Land Policy and Management Act and the National Environmental Policy Act.

PRACTICES COMMON TO ALL ALTERNATIVES

Potential for Caves or Karst

A map of cave or karst potential would be maintained to provide the public with current information about the likelihood of the presence of cave or karst resources. The map would serve as an indicator of the potential for encountering caves or karst for which special practices could be required, following NEPA analysis, to mitigate drilling impacts. The primary use of the map is as a source of information for individuals or companies contemplating the leasing of federal minerals.

Three zones of cave or karst occurrence have been identified and categorized: high potential; medium potential; and low potential (See Maps 26 and 38, in Chapter 3). Areas that contain known cave or karst features are in the high potential zone. Areas containing known soluble rock formations with the potential for cave or karst development are in the medium potential zone. These zones were identified using geologic maps and existing information on caves and karst. All other lands fall into the low potential zone. These zones may be increased or decreased in size as new information from drilling, cave exploration or other sources becomes available.

The cave or karst occurrence zones have been further divided into smaller geographic areas to provide an additional means of identification of a specific area (Tables 89 and 98, and Maps 26 and 38, in Chapter 3). An estimate has been made for each of these areas as to the lowest likely depth at which caves might be expected. Again, this is simply a source of information for individuals or companies contemplating the leasing of federal minerals.

Because the identification of cave or karst potential zones is only informational, the mitigations described below would be applied when and where appropriate, irrespective of any identified zone of cave or karst potential.

The lease notice "Potential Cave or Karst Occurrence Area" (Roswell 46), would be applied to leases when all or part of the lease is located in a potential cave or karst occurrence area. Refer to Figure A5-1 for an example of the lease notice. The purpose of the lease notice, as with maps of cave or karst potential, is to provide information to the purchasers of federal oil and gas leases.

Mitigation of Drilling Impacts

The need to relocate drilling locations to avoid caves or karst, and any special drilling or production practices employed to mitigate impacts to caves or karst, would be determined during the NEPA analysis of APDs or other applications. The practices described below would be applied where needed, and to the extent necessary, to ensure that the potential impacts of drilling oil or gas wells, or of constructing other facilities, in cave or karst areas would be minimized according to the following process:

(1) Detect potential cave or karst resources.

(2) Avoid cave or karst resources where possible.

(3) Mitigate impacts to caves or karst that cannot be avoided.

The results of any detection efforts would be addressed in the NEPA analysis and appropriate mitigations would be developed, if needed, as part of the analysis.

Depending on the results of detection, avoidance would be considered as a means of mitigating potential impacts. In most cases, avoidance would be accomplished by relocation of the proposed well location, which is often done in consultation with the operator at the time of a field examination. Moving a proposed location up to 200 meters is a commonly employed avoidance measure. The need to move a location more than 200 meters would be addressed in the NEPA analysis of an APD.

If the construction of a pipeline, road, power line or other facility is proposed, rerouting or relocation would be required to accomplish avoidance.

ALTERNATIVE A

The management of oil and gas operations in cave or karst areas, including approvals for drilling oil or gas wells, is based on a combination of leasing stipulations, standard operating procedures, use of applicable regulations, and mitigations of impacts derived from NEPA analysis.

Detection Methods

The primary detection method would be the review of records on the presence of caves or karst features in the area of interest, in conjunction with a field exam by a BLM employee or cave inventory contractor to determine the presence of unrecorded cave or karst features. Depending on the results of initial detection efforts and a determination of potential significance by the BLM, cave exploration could be employed to gain additional information.

Surface Mitigation

Whether or not a proposed activity has been relocated to reduce potential impacts on caves or karst, surface mitigations would be applied to minimize the risk of impacts during construction, drilling or production. Appropriate surface mitigations would be developed during the NEPA analysis of a proposal, in addition to the use of the Conditions of Approval (Appendix 4). Surface mitigations could include one or more of the following practices, most of which have long been employed to mitigate impacts.

Practices to minimize potential impacts from reserve pit spills or leakage:

- The use of a closed system or steel tanks;
- The relocation of pits;
- The construction of berms around the pits sufficient to contain any spills.

Practices to minimize potential impacts from leaking tanks or pipelines:

- The construction of berms around storage tanks sufficient to contain any spills;

- The installation of leak detection systems for pipelines or tanks;

- The use of permanent liners in storage tank areas;

- The use of differential pressure shut-off valves;

- The use of corrosion-inhibiting coatings and cathodic protection.

Practices to minimize the potential impacts of vented or escaping gases settling in caves:

- The flaring, rather than venting, of gas, to better disperse the gases and eliminate possible gas ignitions;

- The use of stock tank vapor recovery systems.

Subsurface Mitigation

Applicable and reasonable subsurface mitigations would be applied where the presence of caves or karst is obvious or expected, based on the results of detection efforts, and in lost circulation zones. The mitigations include the following practices.

Drilling:

In consultation with an Operator, the BLM may request the use of either of the following practices, to mitigate impacts to caves or karst.

- Cable tool drilling techniques would be used when possible in areas where encounters of caves or karst are expected at depths not greater that 350 feet.
- Rotary drilling techniques in cave or karst areas would include the use of either fresh water mud or compressed air as a circulating medium.

Casing and Cementing:

- All casing would meet or exceed National Association of Corrosion Engineers specifications pertaining to the geology of the location and be run according to American Petroleum Institute and BLM standards.

Any remedial actions proposed to resolve problems related to bit drops or lost circulation would require BLM concurrence before implementation.

Plugging and Abandonment

The BLM standards for plugging and abandonment in Onshore Oil and Gas Order No. 2 would be applied, to protect or isolate all useable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, caves, and any prospectively valuable deposits of minerals. This includes any zones encountered during drilling that contain fluids with a potential to migrate.

ALTERNATIVE B

The management of oil and gas operations in cave or karst areas, including approvals for drilling oil or gas wells, would be predicated on procedures developed by the BLM's Cave and Karst Area Task Force in 1991, Surface Use and Occupancy Restrictions (Appendix 3), and Conditions of Approval (Appendix 4). These practices would be modified as the technologies for cave and karst protection proposed here are tested, or as new technologies become available, so that unworkable or outdated technologies are replaced with the latest, applicable technologies.

Detection Methods

The primary detection method would be the review of records on the presence of caves or karst features in the area of interest, in conjunction with a field exam by a BLM employee or cave inventory contractor to determine the presence of unrecorded cave or karst features. Depending on the results of initial detection efforts and a determination of potential significance by the BLM, one or more of the following detection methods could be used to gain additional information. This list is not inclusive and other methods may be considered acceptable based on consultation between the BLM and the Operator. (Refer to the Glossary for explanations of these terms.)

- Cave Exploration
- Thermal (Infrared) Mapping
- Natural-Potential Method
- Electrotelluric Surveying
- Ground Penetrating Radar
- Resistivity Survey
- Vertical Seismic Profiling
- High Resolution Seismic Reflection Survey
- Aerial Photography

Surface Mitigation

Whether or not a proposed activity has been relocated to reduce potential impacts on caves or karst, surface mitigations would be applied to minimize the risk of impacts during construction, drilling or production. Appropriate surface mitigations would be developed during the NEPA analysis of a proposal and could include one or more of the following practices, most of which have long been employed to mitigate impacts.

Practices to minimize potential impacts from reserve pit spills or leakage:

- The use of a closed system or steel tanks;
- The use of a modified "V" pit [1] constructed completely below ground level with extra heavy pit liners that are not broken during reclamation;
- The relocation of pits;
- The construction of berms around the pits sufficient to contain any spills.

Practices to minimize potential impacts from leaking tanks or pipelines:

- The construction of berms around storage tanks sufficient to contain any spills;
- The installation of leak detection systems for pipelines or tanks;
- The use of permanent liners in storage tank areas;
- The use of differential pressure shut-off valves;
- The use of corrosion-inhibiting coatings and cathodic protection.

Practices to minimize the potential impacts of vented or escaping gases settling in caves:

- The flaring, rather than venting, of gas, to better disperse the gases and eliminate possible gas ignitions;
- The use of stock tank vapor recovery systems.

Subsurface Mitigation

Applicable and reasonable subsurface mitigations would be applied where the presence of caves or karst is obvious or expected, based on the results of detection efforts, and in lost circulation zones. The mitigations include, but are not limited to, the following practices.

Drilling:

- Cable tool drilling techniques would be used when possible in areas where encounters of caves or karst are expected at depths not greater that 350 feet.
- Rotary drilling techniques in cave or karst areas would include the use of either fresh water mud or compressed air as a circulating medium.

Casing and Cementing:

- All casing would meet or exceed National Association of Corrosion Engineers specifications pertaining to the geology of the location and be run according to American Petroleum Institute and BLM standards.
- A "cave protection" casing with thicker-than-normal walls would be set across any caves encountered during drilling. The thicker-walled, cave-protection casing string would be set at least 100 feet below the last known cave-bearing zone as determined by drilling or other pertinent factors.
- Regardless of the type of drilling machinery used, if bit drops of four feet or more and circulation losses greater than 75 percent occur simultaneously while drilling in any cave-bearing zone, drilling operations would immediately stop and the BLM would be notified by the Operator. If BLM-approved remedial cementing work cannot successfully resolve the problem, the well would be plugged.
- The casing would be cemented in place using one or a combination of any of the following methods that are the most environmentally sound, as determined by the BLM and the Operator:

1. If a large void or severe lost circulation zone is encountered, isolation from above and below rather than complete cement coverage of these zones could be employed. This would be accomplished by using stage cementing equipment, external casing packers, cement baskets, and one-inch remedial cementing techniques.

2. For a less severe lost circulation zone encountered while drilling, the operator would attempt to circulate cement to the surface using a single or multistage cementing job composed of a "lead" and "tail" slurry for each stage.

3. Foam cementing techniques may be used by circulating cement to the surface using a single stage cementing program composed of a lead slurry of nitrified or foamed premium cement with two percent calcium chloride (BWOC) added.

Any remedial actions proposed to resolve problems related to bit drops or lost circulation would require BLM concurrence before implementation.

Monitoring Drilling Operations

Where the presence of caves or karst is obvious or expected, based on the results of detection efforts, and in lost circulation zones, constant monitoring by a BLM representative of drilling operations would be required. The Operator's representative would track the customary drilling activities, including the rate of penetration, pump pressure, weight on bit, and presence or absence of cuttings returning to the surface.

Each detectable void or sudden increase in the rate of penetration not attributable to a change in the formation type would be documented and be evaluated as it is encountered by the Operator's representative and the BLM representative. A log of the drilling rate, percent of mud returns, bit drops and other pertinent data must be compiled and retained. This data would identify the depths and relative volume of lost circulation zones.

Monitoring Production Operations

Annual bradenhead tests would be performed by the Operator on the annulus formed by the production casing and the cave protection casing to ensure the integrity of the casing. If the test results indicated a casing failure, remedial actions approved by the BLM would be undertaken to correct the problem.

Plugging and Abandonment

The BLM standards for plugging and abandonment in Onshore Oil and Gas Order No. 2 would be applied, to protect or isolate all useable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, caves, and any prospectively valuable deposits of minerals. This includes any zones encountered during drilling that contain fluids with a potential to migrate.

Record Keeping

Pertinent observations and records relating to drilling and cementing in cave or karst areas and lost circulations zones would be compiled and submitted to the appropriate BLM office. This information would be used to categorize lost-circulation zones on the basis of severity, and to evaluate and compare the relative success or failure of different remedies attempted to combat lost-circulation problems while drilling and cementing casing in these zones. This information would also be used to update information about the occurrence of cave and karst. Information concerning cave resources gathered during drilling would be submitted, as well, to be retained by the BLM in accordance with the Roswell District Cave Management Plan and the regulations implementing the Federal Cave Resources Protection Act.

ALTERNATIVE C

The management of oil and gas operations in cave or karst areas, including approvals for drilling oil or gas wells, would be the same as that described in Alternative A.

ALTERNATIVE D

The management of oil and gas operations in cave or karst areas, including approvals for drilling oil or gas wells, would be the same as that described in Alternative B, with the following exception.

Detection Methods

The primary detection method would be the review of records on the presence of caves or karst features in the area of interest, in conjunction with a field exam by a BLM employee or cave inventory contractor to determine the presence of unrecorded cave or karst features. Depending on the results of initial detection efforts and a determination of potential significance by the BLM, cave exploration could be employed to gain additional information.

ALTERNATIVE E

The management of oil and gas operations in cave or karst areas, including approvals for drilling oil or gas wells, would be predicated on procedures developed by the BLM's Cave and Karst Area Task Force in 1991, Surface Use and Occupancy Restrictions (Appendix 3), and Conditions of Approval (Appendix 4). These practices would be modified as the technologies for cave and karst protection proposed here are tested, or as new technologies become available, so that unworkable or outdated technologies are replaced with the latest, applicable technologies.

Detection Methods

The primary detection method would be the review of records on the presence of caves or karst features in the area of interest, in conjunction with a field exam by a BLM employee or cave inventory contractor to determine the presence of unrecorded cave or karst features. Depending on the results of initial detection efforts and a determination of potential significance by the BLM, cave exploration could be employed to gain additional information. As various geophysical techniques are proven useful for cave detection and become generally available for use, they may be considered on a case-by-case basis as a means of locating unrecorded cave or karst features.

Surface Mitigation

Whether or not a proposed activity has been relocated to reduce potential impacts on caves or karst, surface mitigations would be applied to minimize the risk of impacts during construction, drilling or production. Appropriate surface mitigations would be developed during the NEPA analysis of a proposal and could include one or more of the following practices, most of which have long been employed to mitigate impacts.

Practices to minimize potential impacts from reserve pit spills or leakage:

- The use of a closed system or steel tanks;
- The use of a modified "V" pit constructed completely below ground level with extra heavy pit liners that are not broken during reclamation;
- The relocation of pits;
- The construction of berms around the pits sufficient to contain any spills.

Practices to minimize potential impacts from leaking tanks or pipelines:

- The construction of berms around storage tanks sufficient to contain any spills;
- The installation of leak detection systems for pipelines or tanks;
- The use of permanent liners in storage tank areas;
- The use of differential pressure shut-off valves;
- The use of corrosion-inhibiting coatings and cathodic protection.

Practices to minimize the potential impacts of vented or escaping gases settling in caves:

- The flaring, rather than venting, of gas, to better disperse the gases and eliminate possible gas ignitions;

- The use of stock tank vapor recovery systems.

Subsurface Mitigation

Applicable and reasonable subsurface mitigations would be applied where the presence of caves or karst is obvious or expected, based on the results of detection efforts, and in lost circulation zones. The mitigations include, but are not limited to, the following practices.

Drilling:

- Cable tool drilling techniques would be used when possible in areas where encounters of caves or karst are expected at depths not greater that 350 feet.

- Rotary drilling techniques in cave or karst areas would include the use of either fresh water mud or compressed air as a circulating medium.

Casing and Cementing:

- All casing would meet or exceed National Association of Corrosion Engineers specifications pertaining to the geology of the location and be run according to American Petroleum Institute and BLM standards.

- A "cave protection" casing with thicker-than-normal walls would be set across any caves encountered during drilling. The thicker-walled, cave-protection casing string would be set at least 100 feet below the last known cave-bearing zone as determined by drilling or other pertinent factors.

- Regardless of the type of drilling machinery used, if bit drops of four feet or more and circulation losses greater than 75 percent occur simultaneously while drilling in any cave-bearing zone, drilling operations would immediately stop and the BLM would be notified by the Operator. If BLM-approved remedial cementing work cannot successfully resolve the problem, the well would be plugged.

- The casing would be cemented in place using one or a combination of any of the following methods that are the most environmentally sound, as determined by the BLM and the Operator:

1. If a large void or severe lost circulation zone is encountered, isolation from above and below rather than complete cement coverage of these zones could be employed. This would be accomplished by using stage cementing equipment, external casing packers, cement baskets, and one-inch remedial cementing techniques.

2. For a less severe lost circulation zone encountered while drilling, the operator would attempt to circulate cement to the surface using a single or multistage cementing job composed of a "lead" and "tail" slurry for each stage.

3. Foam cementing techniques may be used by circulating cement to the surface using a single stage cementing program composed of a lead slurry of nitrified or foamed premium cement with two percent calcium chloride (BWOC) added.

Any remedial actions proposed to resolve problems related to bit drops or lost circulation would require BLM concurrence before implementation.

Monitoring Drilling Operations

Where the presence of caves or karst is obvious or expected, based on the results of detection efforts, and in lost circulation zones, constant monitoring of drilling operations would be required. The Operator would track the customary drilling activities, including the rate of penetration, pump pressure, weight on bit, and presence or absence of cuttings returning to the surface.

Each detectable void or sudden increase in the rate of penetration not attributable to a change in the formation type would be documented and evaluated as it is encountered. A log of the drilling rate, percent of mud returns, bit drops and other pertinent data must be compiled and retained. This data would identify the depths and relative volume of lost circulation zones.

Monitoring Production Operations

Annual bradenhead tests would be performed by the Operator on the annulus formed by the production casing and the cave protection casing to ensure the integrity of the casing. If the test results indicated a casing failure, remedial actions approved by the BLM would be undertaken to correct the problem.

Plugging and Abandonment

The BLM standards for plugging and abandonment in Onshore Oil and Gas Order No. 2 would be applied, to protect or isolate all useable water zones, potentially productive zones, lost circulation zones, abnormally pressured zones, caves, and any prospectively valuable deposits of minerals. This includes any zones encountered during drilling that contain fluids with a potential to migrate.

Record Keeping

Pertinent observations and records relating to drilling and cementing in cave or karst areas and lost circulation zones would be compiled and submitted to the appropriate BLM office. This information would be used to categorize lost-circulation zones on the basis of severity, and to evaluate and compare the relative success or failure of different remedies attempted to combat lost-circulation problems while drilling and cementing casing in these zones. This information would also be used to update information about the occurrence of cave and karst. Information concerning cave resources gathered during drilling would be submitted, as well, to be retained by the BLM in accordance with the Roswell District Cave Management Plan and the regulations implementing the Federal Cave Resources Protection Act.

REFERENCE ON PAGE AP5-4 1. A "V" pit is a "Veltman" pit, named for the originator of the idea, who was an employee of Conoco, Inc. Instead of the standard rectangular pit, a Veltman pit is constructed in a "V" shape. The legs of the pit are narrow and deep. Cuttings and fluids are pumped into the pit at the top of one leg of the "V". The mechanics of the pit cause the cuttings to drop out in the area where the two legs of the "V" meet. Return flows relatively free of cuttings are pumped out at the top of the other leg of the "V". For surface reclamation purposes, the Veltman pit offers a better chance for not rupturing the liner when the pit is closed. The liner can be folded to the center of the legs, and heavy equipment can reach virtually all areas of the pit without having to drive over the liner or excavated area, because of the narrow width of the legs and the opportunity to drive between the legs.

APPENDIX 6
WITHDRAWN LANDS

This appendix describes existing withdrawals and classifications in the Roswell Resource Area, including size, status and purpose.

TABLE A6-1
EXISTING WITHDRAWALS AND CLASSIFICATIONS

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Affect
SO S-1-1929 NM 52408	T. 4 N., R. 18 E. T. 3 N., R. 23 E.	80.00	Air Navigation Site No. 29	Private	Public Land Laws
PLO 2637 3/21/1962 NM 088292	T. 11 S., R. 22 E.	2,589.74	Two Rivers Reservoir Project Area	COE	Public Land Laws generally, including Mining Laws
PLO 6182 NM 23614	T. 12 N., R. 30 E.	52.70	NM Army National Guard Training Site	COE	Settlement, Sale Location Entry including Mining Laws
PLO 2447 NM 061544	T. 10 S., R. 25,26 E.	325.00	Nike Hercules Defense Site	DOD	Public Land Laws including Mining Laws
PLO 2794 NM0268899	T. 1 S., R. 35 E. T. 1 S., R. 36 E.	711.21	Blackwater Draw	Private	Prospecting, Location, Entry Purchase under the Mining Law
EO 4/1/1899 NM 52330		27,620.00	Fort Stanton	BLM	Public Land Laws
NM 25765	T. 1, 2 N., R. 30 E. T. 1 S., R. 30 E.	6,713.90	Melrose Bombing Range	COE	All Forms of Appropriation including general Mining Laws and Mineral Leasing Laws
EO 4/6/1917 NM 52344	T. 7 S., R. 11 E.	6.00	Power Site Reserve No. 596	Private	Settlement, Sale Location Entry
PLO 3526 NM 0554897	T. 10 N., R. 31 E.	480.00	Tucumcari Reclamation Project, Regulator Reservoir No. 2	BOR	Closed to Surface Entry (Mineral Estate Reserved to State)
PLO 3632 NM 0555214	T. 5 N., R. 24 E.	160.00	Sumner Dam and Lake Portion of Carlsbad Project	BOR	Closed to Surface Entry and Mining, but not Mineral Leasing
PLO 3632 NM 52396	T. 4 N., R. 24 E.	122.97	Fort Sumner Reservoir	BOR	Closed to Surface Entry and Mining, but not Mineral Leasing

TABLE A6-1
EXISTING WITHDRAWALS AND CLASSIFICATIONS (Continued)

Authority	Location	Acres	Purpose	Surface Management Agency	Segregative Affect
PLO 3632 NM 52390	T. 5,6 N., R. 23,24 E.	7,839.625	Fort Sumner Dam	BOR	Closed to Surface Entry and Mining, but not Mineral Leasing
PLO 4798 NM 6266	T. 10 N., R. 31 E.	160.00	Tucumcari Reclamation Project	BOR	Closed to Surface Entry (Minerals not owned by US)
SO 8/11/1944 NM 52398	T. 12 N., R. 29 E.	6.50	Tucumcari Project, Conchas Canal	BOR	Closed to Surface Entry and Mining, but not Mineral Leasing
NM77962 including	T. 4,5 N., R. 23,24 E.	3,125.93	Sumner Dam and Reservoir	BOR	Settlement, Sale Location Entry
					Mining Law, but not Mineral Leasing
EO 5/25/1921 NM 42942	T. 9 S., R. 13 E.	15.21	Public Water Reserve No. 77	BLM	Settlement, Sale Non-Metaliferous Entry
EO 5/25/1921 NM 42952	T. 14 S., R. 22 E.	120.00	Public Water Reserve No. 228	BLM	Settlement, Sale Non-Metaliferous Entry
EO 5/25/1921 NM 42954	T. 6,10 S., R. 9 E. T. 8,5 S., R. 8,25 E.	200.00	Public Water Reserve No. 107	BLM	Settlement, Sale Non-Metaliferous Entry
EO 5/25/1921 NM 42958	T. 7,8,10 S., R. 17 E.	333.30	Public water Reserve No. 107	BLM	Settlement, Sale Non-Metaliferous Entry
C&MU 929		66.17	Mescalero Recreation Complex	BLM	Public Land Laws including general Mining Laws and Mineral Leasing Laws
Classification 2639		40.00	Torgac Cave	BLM	Public Land Laws including general Mining Laws and Mineral Leasing Laws

Source: BLM New Mexico State Office, 1994.

APPENDIX 7
RULES OF CONDUCT

This appendix describes rules of conduct for recreation use on public land in the Roswell Resource Area.

The following rules will be in effect for all lands the Roswell Resource Area, following the approval of the Roswell Resource Management Plan. When approved, subsequent rules developed for Bureau of Land Management administered lands in New Mexico or applicable changes in the Code of Federal Regulations would supersede these rules.

SPECIAL RECREATION MANAGEMENT AREAS AND ACECs

In addition to the regulations in 43 CFR 8365.2, the following supplemental rules will be applied to Special Recreation Management Areas and ACECs.

1. Reserving camping space is prohibited. Camping space is allocated on a first come-first served basis. The group shelter at Valley of Fires may be reserved in advance.

2. Camping sites are limited to 10 individuals and 4 vehicles. Groups that exceed the these limits must use a group site.

3. Persons or groups are allowed 14 consecutive days in a designated campground. After the 14th day, campers must move at least 25 miles from the previous location.

4. Cutting or gathering of green or standing dead wood is prohibited in designated campgrounds, picnic areas, overlooks, waysides or adjacent to interpretive trails. In these areas, open fires are restricted to fire rings or grills that the BLM has installed.

5. Equestrian use is prohibited in campgrounds, picnic areas, waysides or adjacent to interpretive trails unless facilities have specifically been provided for such use, or unless specifically authorized.

6. At designated campgrounds, and picnic areas, pets must be confined to a leash that is no longer than 6 feet in length. Pets are not allowed on any designated nature or interpretive trail.

7. Vehicles are restricted to designated and maintained roads within Special Recreation Management Areas and ACECs, unless areas are set aside for OHV use. Road restrictions will be posted at the entrances to each area.

8. Within all designated campgrounds (where camping is allowed), quiet hours are from 10:00 p.m. to 6:00 a.m.

9. The discharge of weapons is prohibited within 1/4 mile of campgrounds, picnic areas, overlooks, waysides and interpretive trails. The use of fireworks is prohibited in these areas.

10. No hunting or trapping is permitted within 1/4 mile of designated campgrounds and picnic areas.

11. No gathering or collecting of plants or any other natural resource is allowed in designated campgrounds, picnic areas, overlooks, waysides and interpretive trails.

12. Day use fees are due upon entrance to a day-use area. Camping fees are due within 1/2 hour after selecting a campsite.

13. Camping checkout time is 10:00 a.m. Day-users must leave the area by 10:00 p.m. or be charged a camping fee.

14. Campers must display their fee stub as instructed on the envelope.

CAVE RESOURCES

The following is a list of ·supplemental rules pertaining to all caves in the Roswell Resource Area.

1. No removal is allowed of any cave resources such as archaeological and historical artifacts, natural materials or features, plant and animal life, or any item of public property.

2. Pets are not permitted in any cave.

3. Minors.

    a. At least one person in the caving party must be 18 years or older and will be responsible for the actions of younger members of the party.

4. Safety Equipment.

    a. Each person in the caving party will wear a safety helmet (hard hat) with chin strap at all times while in the cave(s).

    b. Each person in the caving party will have in their possession at least three sources of light.

5. Litter and Refuse

    a. All materials (flagging tape, litter, etc.) taken into the cave(s) must be removed and properly disposed of at the end of each cave visit.

6. Human solid or liquid waste may not be deposited in any cave.

7. Smoking is not permitted in any cave.

In addition to the general rules of conduct for all caves, the following rules will be in effect for all caves within ACECs, caves where Special Recreation Management Area Plans (SRMA) have been developed, or the caves are intensively managed due to their scientific or recreational value, pursuant to Public Law 96-95, Public Law 100-691, 43 CFR 8364.1, 43 CFR 8360.0-7, and 30-15-6 NMSA 1978.

1. Permits.

    a. Entry to a cave for the purpose of recreation, education, or scientific studies requires a permit issued by the Roswell Resource Area.

    b. Authorization for entry to caves is validated only upon signature of the permittees, and is valid only for those individuals whose signatures appear on the permit.

    c. Permits must be returned to the Roswell Resource Area Office within five days following the completion of a cave trip. The permit form must be returned even if the trip is canceled.

    d. A cave trip authorization is issued for the time period and date specified on the front of the permit. It is revocable at any time upon notice, for any breach of conditions described in the permit, or at the discretion of the authorized officer of the Bureau of Land Management.

    e. Permittees may reserve only two dates per cave in advance.

    f. Applications for cave entrance permits for caves that are closed from November 1 through April 15, will only be accepted from January 1 to November 1 of each year. Permit applications will be accepted at any time for caves in ACECs that are not bat hibernaculums.

g. Permittees must abide by all cave use stipulations attached to permit.

2. Group Size

a. Fort Stanton Cave - maximum group size is 10 persons between the entrance and Hellhole gate and 6 persons beyond Hellhole Gate, including a BLM guide. A total of 16 persons is allowed in cave at one time. Bat Cave visitation is prohibited except for research.

b. Torgac Cave - maximum group size is 6 persons, including a BLM guide.

c. Crockett Cave - maximum group size is 9 persons.

d. All other caves in ACECs - maximum group size is 10 persons.

e. Group size requirements can be waived with written permission from the BLM. The maximum group size per BLM guide is 10 people.

The following caves will be closed to protect hibernating bats from disturbance. Only personnel engaged in management or authorized scientific bat studies, census, monitoring, or when dictated by emergencies will be allowed to enter closed caves.

a. Ten caves containing hibernacula are closed annually to all visitation during the bat hibernation season, from November 1 to April 15 of each year. The ten caves are: Fort Stanton, Torgac, Torgac Annex, Crockett, Crystal, Big-Eared Cave, Bat Hole, Malpais Madness, Tres Ninos and Feather. Other caves identified in the future as hibernacula would also be closed.

OTHER PUBLIC LANDS IN THE ROSWELL RESOURCE AREA

In addition to the regulations contained in 43 CFR 8365. 1 - 2, the following supplemental rules will be applied to all public lands in the Roswell Resource Area:

1. Persons may camp on any specific location on public land outside SRMAs or designated recreation sites in the Roswell Resource Area for a period of not more than 14 days. After the 14th day of occupation, campers must move outside a 25-mile radius of the previous location.

2. Erecting or maintaining any semi-permanent or permanent toilet, shower, or other sanitary facilities or structures on public land is prohibited without authorization.

3. Parking any motor vehicle or camping with 300 yards of any manmade water hole, water well, or watering tank used by wildlife or domestic livestock is prohibited without authorization.

4. On public land where off-road vehicle use is permitted, all vehicles must be equipped with an approved spark arrester and muffler.

5. The use of fireworks is prohibited.

APPENDIX 8
ACQUISITION AND DISPOSAL CRITERIA

This appendix describes the criteria that would be applied to lands in the Roswell Resource Area that may be suitable for acquisition by the BLM or for disposal by the BLM. The criteria are one part of the process in determining suitability.

ACQUISITION CRITERIA

Lands meeting the following criteria would be considered for potential acquisition:

- Facilitates access to areas retained for long-term public use;
- Enhances Congressionally designated areas, rivers or trails;
- Facilitates national, state and local BLM priorities;
- Secures significant water-related lands for the public, including lake shore, river front, stream or pond sites;
- Has important riparian or wetland areas;
- Has significant caves where a portion of the cave is located on public lands;

Cultural sites meeting the following evaluation standards would be considered for acquisition:

- Offers high research values;
- Possesses moderate scarcity in terms of similar sites;
- Possesses some unique value, such as association with an important historic person, or high aesthetic value;
- Contributes significantly to the interpretive potential of cultural resources already in public ownership.

Minerals would be considered for potential acquisition based on the following criteria:

- Offers consolidation of mineral estates;
- Requires acquisition in response to a federal project need:

    a. When development of a federal project precludes the mineral estate owner from exercising development rights.

    b. When the exercise of the mineral estate owner's right of development would materially interfere with the federal project.

Recreation lands meeting any of the following criteria would be considered for potential acquisition:

- Presence of national values, such as Congressionally designated areas, rivers, or trails or sites;
- Presence of values that enhance recreation trails and waterways or the interstate, state, and multi-county use;
- Presence of local values or opportunities for extensive use, such as hunting, fishing, OHV, and caves;

Acquisition would be considered for inholdings within the boundaries of Congressionally designated wilderness areas under BLM administration. Lands adjacent to wilderness areas that enhance the management of the area could be considered for acquisition.

Lands providing significant wildlife values would be considered suitable for potential acquisition based on any of the following criteria:

- Presence of threatened or endangered species;

  a. Federally listed species
  b. Federal candidate species
  c. State listed species of special concern

- Presence of fisheries;

- Presence of big game or upland game habitat such as: crucial winter areas; kidding, fawning, or calving areas; security areas; and crucial breeding, nesting, resting, roosting, feeding, and wintering habitat areas;

- Presence of migratory bird or waterfowl crucial breeding, nesting, resting, roosting, feeding and wintering habitat areas;

- Presence of existing or potential nesting areas for sensitive species of raptors;

- Presence of nongame crucial habitat areas.

Acquisition of riparian or wetland habitat would be considered based on any of the following criteria:

- Presence of a riparian plant community;

- Presence of surface water for most of the year;

- Presence of wetland soils indicative of wetland conditions;

- Potential to support threatened or endangered species;

- Potential for fisheries;

- Adjacent to public lands supporting riparian or wetland habitat.

Acquisition of playa lakes would be considered based on the following criteria:

- Adjacent to public lands supporting playas, sinkholes, oralkali lakes;

- Presence of seasonal or yearlong surface water;

- Mineral estate owned by the federal government;

- Located within wildlife habitat areas (WHAs);

- Importance for waterfowl, big game or nongame species habitat;

- Potential for development as a yearlong source of water and as riparian habitat;

- Provides significant wildlife values.

The acquisition of public access (easements) would be considered in situations where:

- Public land access is interrupted by private- or state-owned inholdings on existing roads that originate from county or state roads;

- Public access is needed to resolve user conflicts;

- Access is needed to enhance management of public lands.

DISPOSAL CRITERIA

Parcels of BLM land would be identified for disposal through sale or exchange under the authority of Sections 203 and 206 of the Federal Land Policy and Management Act of 1976. The following criteria would be used to identify parcels for disposal:

1. A tract because of its location or other characteristics is difficult and uneconomic to manage as part of the public lands, and is not suitable for management by another federal department or agency.

2. A tract was acquired for a specific purpose and the tract is no longer required for that or any other federal purpose.

3. Disposal of a tract will serve important public objectives, including but not limited to, expansion of communities and economic development, which cannot be achieved prudently or feasibly on land other than public land and which outweigh other public objectives and values, including, but not limited to, recreation and scenic values, which would be served by maintaining a tract in federal ownership.

Each parcel identified for sale or exchange would be subject to certain conditions before disposal: conformance with disposal criteria; hazardous waste, wilderness, wildlife, and riparian/wetland evaluations; and cultural and mineral resource clearances and reports. The results of the evaluations and reports would be included in an environmental analysis. A notice of realty action would be subsequently published. Parcels would be retained if the clearances, reports, or environmental analysis show any resource values worth retaining.

APPENDIX 9
LANDS IDENTIFIED FOR ACQUISITION

This appendix lists the legal descriptions of non-BLM lands that may be suitable for consideration for acquisition to further BLM management goals and policies. This list is not intended to be inclusive.

TABLE A9-1
LANDS PROPOSED FOR ACQUISITION
ROSWELL RESOURCE AREA

CHAVES COUNTY

Caprock WHA

Private

Township/Range	Sec.	Acres
T.11S R.30E	33 E½NE¼	80.00
T.11S R.30E	33 NE¼SW¼	80.00
T.11S R.30E	33 W½SE¼	80.00
T.11S R.31E	29 SE¼	160.00
T.11S R.31E	29 NE¼	160.00
T.11S R.31E	29 SE¼SW¼	40.00
T.12S R.30E	04 N½	320.00
T.12S R.30E	13 W½	320.00
T.12S R.31E	05 S½N½	160.00
T.12S R.31E	05 NW¼SE¼	40.00
T.12S R.31E	05 S½NE¼	80.00
T.12S R.31E	05 SW¼	160.00
T.12S R.31E	05 LOT 01	39.61
T.12S R.31E	05 LOT 02	39.62
T.12S R.31E	05 LOT 03	39.64
T.12S R.31E	05 LOT 04	39.65
T.12S R.31E	22 SE¼	160.00
T.12S R.31E	22 NW¼	160.00
T.12S R.31E	22 N½SW¼	80.00
T.12S R.31E	22 SE¼SW¼	40.00
T.12S R.31E	22 SW¼NE¼	40.00
T.12S R.31E	27 N½	320.00
T.12S R.31E	27 SE¼	160.00
T.12S R.31E	34 N½	320.00
T.12S R.31E	34 SW¼	160.00
T.12S R.31E	34 E½SE¼	80.00
T.13S R.31E	03 S½	320.00
T.13S R.31E	03 S½N½	160.00
T.13S R.31E	03 LOT 01	40.25
T.13S R.31E	03 LOT 02	40.24
T.13S R.31E	03 LOT 03	40.22
T.13S R.31E	03 LOT 04	40.21
T.13S R.31E	10 ALL	640.00
T.13S R.31E	22 ALL	640.00
T.13S R.31E	27 ALL	640.00
T.13S R.31E	34 ALL	640.00
T.14S R.31E	03 S½	320.00
T.14S R.31E	03 S½N½	160.00
T.14S R.31E	03 LOT 01	40.29
T.14S R.31E	03 LOT 02	40.25
T.14S R.31E	03 LOT 03	40.23
T.14S R.31E	03 LOT 04	40.19
T.14S R.31E	10 ALL	640.00
T.14S R.31E	15 ALL	640.00

State

Township/Range	Sec.	Acres
T.08S R.30E	36 ALL	640.00
T.08S R.31E	32 ALL	640.00
T.09S R.30E	02 S½N½	160.00
T.09S R.30E	02 SW¼	160.00
T.09S R.30E	02 LOT 01	39.87
T.09S R.30E	02 LOT 02	39.93
T.09S R.30E	02 LOT 03	39.99
T.09S R.30E	02 LOT 04	40.05
T.09S R.30E	36 ALL	640.00
T.09S R.31E	32 ALL	640.00
T.10S R.29E	36 ALL	640.00
T.10S R.30E	02 S½N½	160.00
T.10S R.30E	02 S½	320.00
T.10S R.30E	02 LOT 01	39.74
T.10S R.30E	02 LOT 02	39.75
T.10S R.30E	02 LOT 03	39.77
T.10S R.30E	02 LOT 04	39.79
T.10S R.30E	32 ALL	640.00
T.10S R.31E	30 NE¼NW¼	40.00
T.10S R.31E	30 E½NE¼	80.00
T.10S R.31E	30 NW¼NE¼	40.00
T.10S R.31E	30 SE¼	160.00
T.11S R.30E	02 LOT 01	22.63
T.11S R.30E	02 LOT 02	22.56
T.11S R.30E	02 LOT 03	22.50
T.11S R.30E	02 LOT 04	22.43
T.11S R.30E	02 S½	320.00
T.11S R.30E	16 ALL	640.00
T.11S R.30E	32 ALL	640.00
T.11S R.30E	36 ALL	640.00
T.11S R.31E	32 ALL	640.00
T.12S R.30E	02 LOT 04	39.54
T.12S R.30E	02 S½N½	160.00
T.12S R.30E	02 S½	320.00
T.12S R.30E	02 LOT 01	40.04
T.12S R.30E	02 LOT 02	39.87
T.12S R.30E	02 LOT 03	39.71
T.12S R.30E	14 SE¼SE¼	40.00
T.12S R.30E	15 NW¼NE¼	40.00
T.12S R.30E	22 N½NE¼	80.00
T.12S R.30E	23 E½SE¼	80.00
T.12S R.30E	23 SE¼NE¼	40.00
T.12S R.30E	23 N½N½	160.00
T.12S R.30E	24 N½N½	160.00
T.12S R.30E	24 E½SE¼	80.00
T.12S R.30E	24 SE¼NE¼	40.00
T.12S R.30E	25 E½E½	160.00
T.12S R.30E	26 SW¼SE¼	40.00
T.12S R.30E	26 S½SW¼	80.00
T.12S R.30E	26 E½E½	160.00
T.12S R.30E	27 S½SE¼	160.00
T.12S R.30E	36 ALL	640.00
T.12S R.31E	04 SW¼	160.00
T.12S R.31E	05 NE¼SW¼	40.00
T.12S R.31E	09 SE¼	160.00
T.12S R.31E	16 ALL	640.00
T.12S R.31E	19 E½SE¼	80.00
T.12S R.31E	19 SE¼NE¼	40.00
T.12S R.31E	19 N½N½	160.00
T.12S R.31E	27 SW¼	160.00
T.12S R.31E	30 E½E½	160.00
T.12S R.31E	30 SE¼SW¼	40.00
T.12S R.31E	30 SE¼SE¼	40.00
T.12S R.31E	30 LOT 04	36.56
T.12S R.31E	32 ALL	640.00
T.13S R.30E	02 S½N½	160.00
T.13S R.30E	02 S½	320.00
T.13S R.30E	02 LOT 01	39.99
T.13S R.30E	02 LOT 02	40.02
T.13S R.30E	02 LOT 03	40.04
T.13S R.30E	02 LOT 04	40.07
T.13S R.30E	07 NW¼NW¼	40.00
T.13S R.30E	07 LOT 01	48.15
T.13S R.30E	16 ALL	640.00
T.13S R.30E	36 ALL	640.00
T.13S R.31E	15 ALL	640.00
T.13S R.31E	16 ALL	640.00
T.13S R.31E	32 ALL	640.00
T.14S R.30E	07 S½	320.00
T.14S R.30E	13 S½SE¼	80.00
T.14S R.30E	18 E½	320.00
T.14S R.30E	18 LOT 03	37.79
T.14S R.30E	18 LOT 04	37.73
T.14S R.30E	21 SE¼SE¼	40.00
T.14S R.31E	08 NE¼	160.00
T.14S R.31E	32 ALL	640.00
T.15S R.30E	13 SE¼NW¼	40.00
T.15S R.30E	13 NE¼	160.00

Total - Private	8,480.40
Total - State	18,968.52
Total - Caprock WHA	27,448.92

Cedar Hills Muledeer Area

State

Township/Range	Sec.	Acres
T.08S. R.20E.	05 LOT 01	40.30
T.08S. R.20E.	05 LOT 02	40.26
T.08S. R.20E.	05 S½NE¼	80.00
T.08S. R.20E.	05 SE¼	160.00
T.08S. R.20E.	16 ALL	640.00

Total - State	960.56
Total - Cedar Hills	960.56

Garnsey Bison Kill Site

Private

Township/Range	Sec.	Acres
T.11S R.26E	35 SE¼	160.00
T.12S R.26E	03 LOT 01	40.90
T.12S R.26E	03 LOT 02	40.88

State

Township/Range	Sec.	Acres
T.11S R.26E	36 SW¼	160.00
T.12S R.26E	02 N½N½	160.00

Total - Private	241.78
Total - State	320.00
Total - Garnsey Kill Site	561.78

Haystack Mountain OHV Area

Private

Township/Range	Sec.	Acres
T.07S R.26E	13 S½	320.00
T.07S R.26E	24 ALL	640.00
T.07S R.26E	36 ALL	640.00
T.07S R.27E	18 N½SW¼	80.00
T.07S R.27E	19 E½SE¼	80.00
T.07S R.27E	20 E½NE¼	80.00
T.07S R.27E	20 SW¼	160.00
T.07S R.27E	31 E½	320.00
T.08S R.26E	06 ALL	640.00
T.08S R.26E	13 ALL	640.00
T.08S R.26E	14 ALL	640.00
T.08S R.26E	23 ALL	640.00
T.08S R.26E	24 W½	320.00

State

Township/Range	Sec.	Acres
T.07S R.27E	18 NW¼	160.00
T.08S R.26E	02 ALL	640.00
T.08S R.27E	07 ALL	640.00

Total - Private	5,200.00
Total - State	1,440.00
Total - Haystack Mountain	6,640.00

TABLE A9-1 (continued)

LANDS PROPOSED FOR ACQUISITION

Mescalero Sands

Private

Township/Range		Sec.		Acres
T.11S	R.31E	06	SE¼	160.00
T.11S	R.31E	06	LOT 01	22.58
T.11S	R.31E	06	LOT 02	22.66
T.12S	R.30E	13	W½	320.00

STATE

Township/Range		Sec.		Acres
T.10S	R.30E	32	ALL	640.00
T.11S	R.30E	02	S½S½	160.00
T.11S	R.30E	02	LOT 01	22.63
T.11S	R.30E	02	LOT 02	22.56
T.11S	R.30E	02	LOT 03	22.50
T.11S	R.30E	02	LOT 04	22.43
T.11S	R.30E	36	ALL	640.00
T.12S	R.30E	02	ALL	640.00
T.12S	R.30E	13	NW¼NE¼	40.00
T.12S	R.30E	14	SE¼SE¼	40.00
T.12S	R.30E	22	N½NE¼	80.00
T.12S	R.30E	23	E½SE¼	80.00
T.12S	R.30E	23	N½N½	160.00
T.12S	R.30E	23	SE¼SE¼	40.00
T.12S	R.30E	24	N½N½	160.00
T.12S	R.30E	24	E½SE¼	80.00
T.12S	R.30E	24	SE¼NE¼	40.00
T.12S	R.30E	25	E½E½	160.00
T.12S	R.30E	26	E½NE¼	80.00
T.12S	R.30E	26	NE¼SE¼	40.00
T.12S	R.30E	26	S½S½	160.00
T.12S	R.30E	27	S½SE¼	80.00
T.12S	R.31E	19	N½N½	160.00
T.12S	R.31E	19	N½SE¼	80.00
T.12S	R.31E	19	SE¼NE¼	40.00
T.12S	R.31E	30	NE¼SE¼	40.00
T.12S	R.31E	30	S½S½	160.00
T.12S	R.31E	30	E½NE¼	80.00

Total - Private	525.24
Total - State	3,970.12
Total - Mescalero Sands	4,495.36

Overflow Wetlands

Private

Township/Range		Sec.		Acres
T.12S	R.26E	03	LOT 04	41.15
T.12S	R.26E	03	LOT 03	41.06
T.12S	R.26E	03	NW¼SE¼	41.06
T.12S	R.26E	03	SW¼	160.00
T.12S	R.26E	03	SW¼SE¼	40.00
T.12S	R.26E	03	S½NW¼	80.00
T.12S	R.26E	05	LOT 02	33.66
T.12S	R.26E	05	SW¼SE¼	40.00
T.12S	R.26E	08	W½E½	160.00
T.12S	R.26E	08	NE¼SE¼	40.00
T.12S	R.26E	08	SE¼SE¼	40.00
T.12S	R.26E	09	SW¼SW¼	40.00
T.12S	R.26E	10	NE¼NW¼	40.00
T.12S	R.26E	10	E½	320.00
T.12S	R.26E	15	E½E½	160.00
T.12S	R.26E	20	NE¼NW¼	40.00
T.12S	R.26E	20	NW¼NE¼	40.00

STATE

Township/Range		Sec.		Acres
T.11S	R.25E	36	ALL	640.00
T.12S	R.26E	15	W½E½	160.00
T.12S	R.26E	16	ALL	640.00
T.12S	R.26E	21	N½NE¼	80.00
T.12S	R.26E	21	N½NW¼	80.00
T.12S	R.26E	22	NW¼NW¼	40.00

Total - Private	1,356.93
Total - State	1,640.00
Total - Overflow Wetlands	2,996.93

Pecos River

Private

Township/Range		Sec.		Acres
T.04S	R.25E	01	NE¼SW¼	40.00
T.04S	R.25E	01	W½W½	160.00
T.04S	R.25E	02	NW¼SW¼	40.00
T.04S	R.25E	02	SW¼NW¼	40.00
T.04S	R.25E	03	NW¼	160.00
T.04S	R.25E	03	N½S½	160.00
T.04S	R.25E	03	SE¼SE¼	40.00
T.04S	R.25E	03	SW¼NE¼	40.00
T.04S	R.25E	04	E½NE¼	80.00
T.04S	R.25E	11	SW¼SE¼	40.00
T.04S	R.25E	12	N½NE¼	80.00
T.04S	R.25E	12	SW¼NE¼	40.00
T.04S	R.25E	12	SE¼NW¼	40.00
T.04S	R.25E	14	N½NE¼	80.00
T.04S	R.25E	14	SE¼NE¼	40.00
T.04S	R.25E	23	E½SE¼	80.00
T.04S	R.25E	23	SE¼NE¼	40.00
T.04S	R.25E	24	W½W½	160.00
T.04S	R.25E	26	NE¼NE¼	40.00
T.05S	R.25E	23	SE¼SW¼	40.00
T.05S	R.25E	23	S½SE¼	80.00
T.05S	R.25E	24	SW¼SW¼	40.00
T.05S	R.25E	26	NW¼	160.00
T.05S	R.25E	26	N½NE¼	80.00
T.05S	R.25E	26	SW¼NE¼	40.00
T.05S	R.25E	26	W½SW¼	80.00
T.05S	R.25E	35	NW¼NW¼	40.00
T.06S	R.26E	09	E½E½	80.00
T.06S	R.26E	09	E½W½	80.00
T.06S	R.26E	28	W½SW¼	80.00
T.06S	R.26E	32	N½SE¼	80.00
T.06S	R.26E	32	SW¼NE¼	40.00
T.06S	R.26E	32	SE¼SE¼	40.00
T.06S	R.26E	32	W½SE¼	80.00
T.06S	R.26E	33	SW¼NW¼	40.00
T.07S	R.26E	17	S½NW¼	80.00
T.07S	R.26E	17	N½S½	160.00
T.07S	R.26E	17	SE¼SE¼	40.00
T.07S	R.26E	20	NW¼NE¼	40.00
T.07S	R.26E	20	SW¼SE¼	40.00
T.07S	R.26E	29	E½SW¼	80.00
T.07S	R.26E	29	N½NE¼	80.00
T.07S	R.26E	29	SE¼NW¼	40.00
T.07S	R.26E	29	SW¼NE¼	40.00
T.07S	R.26E	29	SW¼SW¼	40.00
T.07S	R.26E	31	N½SE¼	80.00
T.07S	R.26E	31	SE¼SW¼	40.00
T.07S	R.26E	31	SW¼SE¼	40.00
T.09S	R.25E	02	NW¼SE¼	40.00
T.09S	R.25E	02	SW¼NE¼	40.00
T.09S	R.25E	11	NW¼SE¼	40.00
T.09S	R.25E	11	SW¼	160.00
T.09S	R.25E	14	W½NE¼NW¼	20.00
T.09S	R.25E	14	NW¼NW¼	40.00
T.09S	R.25E	22	N½NE¼	80.00
T.10S	R.25E	33	NE¼NE¼	40.00
T.10S	R.25E	34	W½W½	160.00
T.12S	R.26E	33	S½S½S½SE¼SE¼	5.00
T.12S	R.26E	33	S½S½S½SW¼SE¼	5.00
T.12S	R.26E	33	S½S½S½SW¼SW¼	5.00
T.12S	R.26E	34	S½S½S½SW¼SW¼	3.11
T.13S	R.26E	03	LOT 04	33.48
T.13S	R.26E	03	N½SW¼NW¼	20.00
T.13S	R.26E	04	LOT 01	42.70
T.13S	R.26E	04	LOT 02	42.66
T.13S	R.26E	04	LOT 03	42.61
T.13S	R.26E	04	SE¼NE¼	40.00
T.13S	R.26E	04	W½S½SW¼NE¼	5.00
T.13S	R.26E	04	SE¼NW¼	30.00
T.13S	R.26E	03	S½SW¼NW¼	20.00
T.13S	R.26E	03	W½SW¼	80.00
T.13S	R.26E	04	N½SW¼NE¼	20.00
T.13S	R.26E	04	NE¼SE¼	40.00
T.13S	R.26E	10	NW¼NW¼	20.00

State

Township/Range		Sec.		Acres
T.04S	R.25E	02	E½SW¼	80.00
T.04S	R.25E	02	SE¼	160.00
T.04S	R.25E	02	SE¼NW¼	40.00
T.04S	R.25E	02	SW¼NE¼	40.00
T.04S	R.25E	02	SW¼SW¼	40.00
T.04S	R.25E	23	NE¼NE¼	40.00
T.04S	R.25E	26	E½SE¼	80.00
T.04S	R.25E	26	SE¼NE¼	40.00
T.04S	R.25E	35	E½E½	160.00
T.04S	R.25E	36	ALL	640.00
T.05S	R.25E	01	LOT 01	40.02
T.05S	R.25E	01	LOT 02	40.04
T.05S	R.25E	01	SE¼	160.00
T.05S	R.25E	01	S½NE¼	80.00
T.05S	R.25E	23	W½SW¼	80.00
T.06S	R.26E	16	N½N½	160.00
T.07S	R.25E	36	E½SE¼	80.00
T.07S	R.26E	32	ALL	640.00
T.09S	R.25E	02	E½SE¼	80.00
T.09S	R.25E	02	LOT 01	40.03
T.09S	R.25E	02	SE¼NE¼	40.00

Total - Private	4,354.56
Total - State	2,760.09
Total - Pecos River	7,114.65

Playa Lakes

Private

Township/Range		Sec.		Acres
T.06S	R.20E	28	NE¼SE¼	40.00
T.06S	R.23E	28	SE¼	160.00
T.07S	R.29E	13	SE¼SE¼	40.00
T.07S	R.29E	24	NE¼NE¼	40.00
T.07S	R.30E	18	E½W½	160.00
T.07S	R.30E	18	LOT 01	42.34
T.07S	R.30E	18	LOT 02	42.23
T.07S	R.30E	18	LOT 03	42.12
T.07S	R.30E	18	LOT 04	42.01
T.07S	R.30E	19	NE¼NW¼	40.00
T.07S	R.30E	19	LOT 01	41.90
T.08S	R.24E	03	W½SE¼	80.00
T.09S	R.30E	07	SE¼SE¼	40.00
T.13S	R.26E	01	SW¼SW¼	40.00

TABLE A9-1 (continued)

LANDS PROPOSED FOR ACQUISITION

Township/Range	Sec.	Acres
T.14S R.25E	26 S½SE¼	80.00
T.14S R.30E	06 SW¼SE¼	40.00
T.14S R.30E	06 SE¼SW¼	40.00

State

Township/Range	Sec.	Acres
T.14S R.30E	06 LOT 07	37.90
T.14S R.30E	07 E½NW¼	160.00
T.14S R.30E	07 LOT 01	37.92
T.14S R.30E	07 LOT 02	37.93
T.14S R.30E	18 E½W½	160.00
T.14S R.30E	18 LOT 01	37.91
T.14S R.30E	18 LOT 02	37.85
Total - Private		1,010.60
Total - State		509.51
Total - Playa Lakes		1,520.11

Pecos River Deer Habitat

State

Township/Range	Sec.	Acres
T.06S. R.27E.	16 ALL	640.00
T.06S. R.27E.	32 ALL	640.00
T.07S. R.26E.	36 ALL	640.00
T.08S. R.26E.	02 ALL	640.00
Total - State		2,560.00
Total - Pecos Deer Habitat		2,560.00

Railroad Mountain

Private

Township/Range	Sec.	Acres
T.09S. R.29E.	32 N½N½N½	80.00
T.09S. R.29E.	33 N½N½	160.00
T.09S. R.29E.	34 N½N½	160.00
T.09S. R.29E.	34 N½N½N½	80.00
T.09S. R.29E.	35 N½N½	160.00
Total - Private		640.00
Total - Railroad Mountain		640.00

Twin Buttes

Private

Township/Range	Sec.	Acres
T.04S. R.28E.	08 S½	320.00
T.04S. R.28E.	08 S½N½	160.00
Total - Private		480.00
Total - Twin Butes		480.00

DEBACA COUNTY

Private

Township/Range	Sec.	Acres
T.02S R.21E	08 SE¼	160.00
T.02S R.21E	09 S½	320.00
T.02S R.21E	10 N½	320.00
T.02S R.21E	10 SE¼	160.00
T.02S R.21E	10 SW¼SW¼	40.00
T.02S R.21E	11 ALL	640.00
T.02S R.21E	13 ALL	640.00
T.02S R.21E	15 ALL	640.00
T.02S R.21E	16 ALL	640.00
T.02S R.21E	17 NW¼	160.00
T.02S R.21E	17 S½	320.00
T.02S R.21E	17 S½NE¼	80.00
Total - Private		4,120.00
Total - DeBaca County		4,120.00

LINCOLN COUNTY

Carrizozo Lava Flow

Private

Township/Range	Sec.	Acres
T.08S R.09E	11 LOT 01	.50
T.08S R.09E	12 E½NW¼	80.00
T.08S R.09E	12 LOT 01	6.30
T.08S R.09E	12 LOT 02	26.58
T.08S R.09E	12 LOT 03	16.68
T.08S R.09E	12 LOT 04	35.62
T.08S R.09E	13 E½NW¼	80.00
T.08S R.09E	14 LOT 01	8.89
T.08S R.09E	15 LOT 02	22.69

State

Township/Range	Sec.	Acres
T.07S R.09E	36 ALL	640.00
T.08S R.09E	02 ALL	640.00
T.08S R.09E	16 ALL	640.00
Total - Private		277.76
Total - State		1,920.00
Total - Carrizozo Lava Flow		2,197.76

Fort Stanton

State

Township/Range	Sec.	Acres
T.09S R.14E	29 W½SW¼	80.00
T.09S R.14E	32 NE¼SW¼	40.00
T.09S R.14E	32 NW¼SW¼	40.00
T.09S R.14E	32 W½NW¼	80.00
T.09S R.15E	36 ALL	640.00
T.10S R.14E	16 SE¼NW¼	40.00
T.10S R.14E	16 S½	320.00
T.10S R.14E	16 S½NE¼	80.00
Total - State		1,320.00
Total - Fort Stanton		1,320.00

Playas

Private

Township/Range	Sec.	Acres
T.06S R.09E	11 N½NW¼	80.00
T.08S R.14E	18 NE¼NE¼	40.00
Total - Private		120.00
Total - Playas		120.00

Rio Bonito

State

Township/Range	Sec.	Acres
T.10S R.16E	02 LOT 01	39.63
T.10S R.16E	02 LOT 02	39.68
T.10S R.16E	02 LOT 03	39.69
T.10S R.16E	02 NE¼SE¼	40.00
T.10S R.16E	02 SE¼NW¼	40.00
T.10S R.16E	02 S½NE¼	80.00
Total - State		279.00
Total Acres		279.00

Rio Bonito Falls

Private

Township/Range	Sec.	Acres
T.10S. R.14E.	04 LOT 01	10.50
T.10S. R.14E.	04 LOT 02	37.14
T.10S. R.14E.	04 SW¼SW¼	40.00
T.10S. R.14E.	09 LOT 04	30.56
T.10S. R.14E.	09 NW¼NW¼	40.00
Total - State		158.20
Total Acres		158.20

ACREAGE SUMMARY

CHAVES COUNTY		
	Private	22,289.51
	State	33,128.80
	Total	55,418.31
DEBACA COUNTY		
	Private	4,120.00
	State	0.00
	Total	4,120.00
LINCOLN COUNTY		
	Private	397.76
	State	3,677.20
	Total	4,074.96
GRAND TOTAL ALL COUNTIES		
	Private	26,807.27
	State	36,806.00
Grand Total		63,613.27

APPENDIX 10
LANDS IDENTIFIED FOR DISPOSAL

This appendix lists the legal descriptions of BLM-administered lands that may be suitable for consideration for disposal. These lands were nominated for disposal by the public or were identified by BLM staff as not needed for implementation of BLM management goals and policies. This list is not intended to be inclusive.

The lands identified in this appendix would be disposed under the authority of Sections 203 (sales) and 206 (exchanges) of the Federal Land Policy and Management Act of 1976, based on the disposal criteria listed in Appendix 8. Other authorities (e.g., Recreation and Public Purposes Act) could apply, as well. Because this preliminary list of lands has not had close scrutiny to actually determine the suitability of these lands for disposal, it is not possible at this time to identify the specific authority under which disposals would be made.

TABLE A10-1

PUBLIC LANDS PROPOSED FOR DISPOSAL

CHAVES COUNTY

Township/Range		Sec.		Acres	Township/Range		Sec.		Acres	Township/Range		Sec.		Acres
T04S	R22E	04	LOT 03	40.13	T07S	R25E	04	LOT 01	40.04	T07S	R26E	30	NE¼NW¼	40.00
T04S	R22E	04	E½SW¼	80.00	T07S	R25E	04	LOT 02	40.01	T07S	R32E	23	E½NE¼	80.00
T04S	R22E	04	SE¼NW¼	40.00	T07S	R25E	04	LOT 03	39.97	T07S	R32E	24	NW¼	160.00
T04S	R22E	10	SE¼SW¼	40.00	T07S	R25E	04	LOT 04	39.92	T07S	R32E	27	E½SW¼	80.00
T04S	R22E	21	N½N½	160.00	T07S	R25E	04	S½	320.00	T07S	R32E	27	NW¼SE¼	40.00
T04S	R23E	18	LOT 01	42.96	T07S	R25E	04	S½N½	160.00	T07S	R32E	28	NW¼SE¼	40.00
T04S	R23E	18	LOT 02	43.09	T07S	R25E	05	LOT 01	39.99	T07S	R32E	33	SE¼NE¼	40.00
T04S	R23E	18	LOT 03	43.21	T07S	R25E	05	LOT 02	39.96	T07S	R32E	34	NW¼NW¼	40.00
T04S	R23E	18	LOT 04	43.34	T07S	R25E	05	SE¼	160.00	T07S	R32E	34	S½NW¼	80.00
T04S	R23E	18	E½W½	160.00	T07S	R25E	05	S½NE¼	80.00	T07S	R32E	35	S½NW¼	80.00
T06S	R25E	09	S½	320.00	T07S	R25E	09	N½SE¼	80.00	T07S	R33E	18	SE¼	160.00
T06S	R25E	10	S½	320.00	T07S	R25E	09	S½S½	160.00	T07S	R33E	19	LOT 01	37.71
T06S	R25E	15	ALL	640.00	T07S	R25E	10	ALL	640.00	T07S	R33E	19	LOT 02	37.77
T06S	R25E	21	E½	320.00	T07S	R25E	15	ALL	640.00	T07S	R33E	19	LOT 03	37.83
T06S	R25E	21	E½W½	160.00	T07S	R25E	18	LOT 01	37.62	T07S	R33E	19	LOT 04	37.89
T06S	R25E	21	W½SW¼	80.00	T07S	R25E	18	NE¼NW¼	40.00	T07S	R33E	19	E½	320.00
T06S	R25E	22	N½	320.00	T07S	R25E	19	LOT 01	37.60	T07S	R33E	19	E½W½	160.00
T06S	R25E	22	N½S½	160.00	T07S	R25E	19	LOT 02	37.20	T07S	R33E	20	N½	320.00
T06S	R25E	22	S½SW¼	80.00	T07S	R25E	19	LOT 03	36.80	T07S	R33E	22	W½	320.00
T06S	R25E	23	N½	320.00	T07S	R25E	19	LOT 04	36.40	T07S	R33E	27	NE¼	160.00
T06S	R25E	26	ALL	640.00	T07S	R25E	20	ALL	640.00	T07S	R33E	27	S½	320.00
T06S	R25E	27	NW¼	160.00	T07S	R25E	21	W½	320.00	T07S	R33E	28	SE¼	160.00
T06S	R25E	27	N½SW¼	80.00	T07S	R25E	22	NW¼SE¼	40.00	T07S	R33E	29	SE¼	160.00
T06S	R25E	27	S½SE¼	80.00	T07S	R25E	22	N½	320.00	T08S	R21E	05	LOT 02	39.84
T06S	R25E	28	E½	320.00	T07S	R25E	22	W½SW¼	80.00	T08S	R21E	05	LOT 03	39.88
T06S	R25E	33	N½NE¼	80.00	T07S	R25E	24	E½SE¼	80.00	T08S	R21E	05	LOT 04	39.91
T06S	R25E	33	SE¼	160.00	T07S	R25E	25	S½N½	160.00	T08S	R21E	05	N½SW¼	80.00
T06S	R25E	33	SW¼NE¼	40.00	T07S	R25E	25	W½SE¼	80.00	T08S	R21E	05	SE¼NE¼	40.00
T07S	R20E	18	SW¼NE¼	40.00	T07S	R25E	28	ALL	640.00	T08S	R21E	05	SW¼NE¼	40.00
T07S	R20E	21	SE¼SE¼	40.00	T07S	R25E	29	ALL	640.00	T08S	R21E	05	S½NW¼	80.00
T07S	R20E	22	SW¼SW¼	40.00	T07S	R25E	30	LOT 01	36.20	T08S	R21E	05	W½SE¼	80.00
T07S	R20E	27	NW¼NW¼	40.00	T07S	R25E	30	LOT 02	36.42	T08S	R21E	06	SE¼	160.00
T07S	R20E	28	NE¼NE¼	40.00	T07S	R25E	30	LOT 03	37.34	T08S	R21E	07	LOT 09	55.07
T07S	R20E	34	N½SW¼	80.00	T07S	R25E	30	LOT 04	37.75	T08S	R21E	07	LOT 16	55.01
T07S	R20E	34	S½NW¼	80.00	T07S	R25E	30	E½	320.00	T08S	R21E	07	LOT 18	40.00
T07S	R20E	34	S½S½	160.00	T07S	R25E	30	E½W½	160.00	T08S	R21E	07	SW¼NE¼	40.00
T07S	R21E	20	S½S½	160.00	T07S	R25E	31	LOT 01	37.85	T08S	R24E	01	LOT 04	39.49
T07S	R21E	30	LOT 01	55.74	T07S	R25E	31	LOT 02	37.85	T08S	R24E	01	SW¼NW¼	40.00
T07S	R21E	30	LOT 03	40.00	T07S	R25E	31	LOT 03	37.75	T08S	R24E	01	S½	320.00
T07S	R21E	30	LOT 04	40.00	T07S	R25E	31	LOT 04	37.65	T08S	R24E	03	E½SE¼	80.00
T07S	R21E	30	LOT 05	40.00	T07S	R25E	31	E½	320.00	T08S	R24E	03	SW¼	160.00
T07S	R21E	30	LOT 08	55.70	T07S	R25E	31	E½W½	160.00	T08S	R24E	10	N½	320.00
T07S	R21E	30	LOT 11	40.00	T07S	R25E	33	ALL	640.00	T08S	R24E	10	N½S½	160.00
T07S	R21E	30	LOT 12	40.00	T07S	R25E	34	ALL	640.00	T08S	R24E	10	S½SE¼	80.00
T07S	R21E	30	LOT 17	40.00	T07S	R26E	06	LOT 03	39.95	T08S	R24E	11	ALL	640.00
T07S	R21E	30	LOT 18	40.00	T07S	R26E	06	LOT 04	36.77	T08S	R25E	04	LOT 01	39.91
T07S	R21E	30	LOT 19	40.00	T07S	R26E	07	E½SW¼	80.00	T08S	R25E	04	LOT 02	39.94
T07S	R21E	30	N½SE¼	80.00	T07S	R26E	18	LOT 02	36.50	T08S	R25E	04	LOT 03	39.97
T07S	R24E	23	SE¼	160.00	T07S	R26E	18	SE¼NW¼	40.00	T08S	R25E	04	NW¼NW¼	40.00
T07S	R24E	24	S½	320.00	T07S	R26E	18	S½NE¼	80.00	T08S	R25E	04	S½	320.00
T07S	R24E	25	ALL	640.00	T07S	R26E	19	LOT 01	36.65	T08S	R25E	04	S½N½	160.00
T07S	R24E	26	E½	320.00	T07S	R26E	19	LOT 02	36.75	T08S	R25E	05	E½NW¼	80.00
T07S	R24E	35	E½	320.00	T07S	R26E	19	LOT 03	36.85	T08S	R25E	05	NE¼	160.00
T07S	R25E	01	LOT 03	40.15	T07S	R26E	19	LOT 04	36.95	T08S	R25E	05	S½	320.00
T07S	R25E	01	LOT 04	40.21	T07S	R26E	19	E½W½	160.00	T08S	R25E	06	LOT 01	37.85
T07S	R25E	01	S½NW¼	80.00	T07S	R26E	19	W½E½	160.00	T08S	R25E	06	LOT 02	37.95
T07S	R25E	03	LOT 01	40.34	T07S	R26E	30	LOT 01	36.97	T08S	R25E	06	E½SW¼	80.00
T07S	R25E	03	LOT 02	40.29	T07S	R26E	30	LOT 02	36.92	T08S	R25E	06	SE¼	160.00
T07S	R25E	03	LOT 03	40.25	T07S	R26E	30	LOT 03	36.87	T08S	R25E	08	E½SW¼	80.00
T07S	R25E	03	LOT 04	40.20	T07S	R26E	30	LOT 04	36.82	T09S	R22E	33	ALL	640.00
T07S	R25E	03	S½	320.00	T07S	R26E	30	E½NW¼	80.00	T09S	R22E	34	ALL	640.00
T07S	R25E	03	S½N½	160.00	T07S	R26E	30	NE¼	160.00	T10S	R22E	03	LOT 01	40.56

TABLE A10-1 (continued)

PUBLIC LANDS PROPOSED FOR DISPOSAL

Township/Range		Sec.		Acres
T10S	R22E	03	LOT 02	40.58
T10S	R22E	03	LOT 03	40.61
T10S	R22E	03	LOT 04	40.64
T10S	R22E	03	S½	320.00
T10S	R22E	03	S½N½	160.00
T10S	R22E	04	LOT 01	40.74
T10S	R22E	04	LOT 02	40.77
T10S	R22E	04	LOT 03	40.79
T10S	R22E	04	NE¼SE¼	40.00
T10S	R22E	04	S½NE¼	80.00
T10S	R22E	10	NE¼	160.00
T10S	R22E	11	N½	320.00
T10S	R22E	12	N½NE¼	80.00
T10S	R29E	22	NE¼NW¼	40.00
T10S	R29E	23	SE¼	160.00
T10S	R29E	26	NE¼NE¼	40.00
T10S	R30E	25	N½	320.00
T10S	R30E	26	NW¼	160.00
T10S	R30E	26	N½NE¼	80.00
T10S	R30E	27	N½	320.00
T10S	R30E	28	N½	320.00
T10S	R30E	29	N½	320.00
T11S	R26E	13	S½	320.00
T11S	R26E	14	ALL	640.00
T11S	R26E	22	E½	320.00
T11S	R26E	22	E½W½	160.00
T11S	R26E	22	W½NW¼	80.00
T11S	R26E	23	ALL	640.00
T11S	R26E	24	SE¼	160.00
T11S	R26E	24	S½NW¼	80.00
T11S	R26E	25	S½	320.00
T11S	R26E	27	E½E½	160.00
T11S	R26E	27	NW¼NE¼	40.00
T11S	R26E	35	NW¼	160.00
T11S	R26E	35	N½SW¼	80.00
T11S	R27E	19	N½SE¼	80.00
T11S	R27E	30	LOT 03	36.02
T11S	R27E	30	LOT 04	36.23
T11S	R27E	31	LOT 01	36.83
T11S	R27E	31	LOT 02	37.80
T11S	R27E	31	LOT 03	38.78
T11S	R27E	31	LOT 04	39.75
T11S	R27E	31	E½SW¼	80.00
T11S	R27E	31	S½SE¼	80.00
T12S	R20E	30	LOT 05	37.89
T12S	R20E	30	LOT 06	32.80
T12S	R20E	30	LOT 07	34.95
T12S	R20E	30	LOT 09	40.77
T12S	R20E	30	LOT 10	40.99
T12S	R20E	30	LOT 11	36.78
T12S	R20E	30	LOT 12	39.08
T12S	R20E	30	NE¼NE¼	40.00
T12S	R20E	30	SE¼NW¼	40.00
T12S	R20E	31	LOT 07	40.00
T12S	R20E	31	LOT 08	32.28
T12S	R20E	31	LOT 09	34.69
T12S	R20E	31	LOT 10	34.58
T12S	R20E	31	E½SW¼	80.00
T12S	R20E	31	SE¼NW¼	40.00
T12S	R27E	04	S½	320.00
T12S	R27E	04	S½N½	160.00
T12S	R27E	05	N½SW¼	80.00
T12S	R27E	05	SE¼	160.00
T12S	R27E	05	S½N½	160.00
T12S	R27E	06	LOT 01	40.52
T12S	R27E	06	LOT 02	40.38
T12S	R27E	06	S½NE¼	80.00
T12S	R27E	06	W½SE¼	80.00
T12S	R27E	07	LOT 01	40.87
T12S	R27E	07	LOT 02	40.82
T12S	R27E	07	LOT 03	40.98
T12S	R27E	07	LOT 04	41.13
T12S	R27E	07	E½W½	160.00
T12S	R27E	07	SE¼	160.00
T12S	R27E	07	W½NE¼	80.00
T12S	R27E	08	E½	320.00
T12S	R27E	09	ALL	640.00
T14S	R19E	02	LOT 05	11.92
T14S	R19E	02	LOT 06	24.76
T14S	R19E	02	LOT 07	24.76
T14S	R19E	02	LOT 08	24.76
T14S	R29E	04	LOT 05	50.18
T14S	R29E	04	LOT 06	22.20
T14S	R29E	04	LOT 07	15.18
T14S	R29E	04	SW¼	160.00
T14S	R29E	04	S½NW¼	80.00
T14S	R29E	05	LOT 06	40.41
T14S	R29E	05	LOT 07	40.54
T14S	R29E	05	LOT 08	40.68
T14S	R29E	05	LOT 09	40.81
T14S	R29E	05	LOT 10	17.41
T14S	R29E	05	LOT 11	17.34
T14S	R29E	05	E½SW¼	80.00

TOTAL - Chaves County 37,324.51

DeBACA COUNTY

Township/Range		Sec.		Acres
T01N	R21E	01	LOT 01	40.09
T01N	R21E	01	LOT 02	40.30
T01N	R21E	01	LOT 03	40.49
T01N	R21E	01	LOT 04	40.71
T01N	R21E	05	LOT 01	40.58
T01N	R21E	05	LOT 02	40.55
T01N	R21E	05	LOT 03	40.55
T01N	R21E	05	LOT 04	40.52
T01N	R21E	05	S½N½	160.00
T01N	R21E	06	LOT 01	40.46
T01N	R21E	06	LOT 02	40.32
T01N	R21E	06	LOT 03	40.19
T01N	R21E	06	SE¼NE¼	40.00
T01N	R21E	11	NE¼SE¼	40.00
T01N	R21E	12	NW¼SW¼	40.00
T01N	R21E	12	NW¼SW¼	40.00
T01N	R21E	29	N½N½	160.00
T01N	R21E	33	ALL	640.00
T01N	R22E	05	NW¼SE¼	40.00
T01N	R22E	07	LOT 04	40.68
T01N	R24E	31	NE¼NW¼	40.00
T01N	R24E	31	N½NE¼	80.00
T01N	R24E	34	NW¼NW¼	40.00
T01N	R24E	34	SW¼	160.00
T02N	R20E	24	SW¼SW¼	40.00
T02N	R20E	25	S½SE¼	80.00
T02N	R21E	20	N½NW¼	80.00
T02N	R21E	30	LOT 02	39.53
T02N	R21E	30	NE¼NE¼	40.00
T02N	R21E	31	LOT 01	39.31
T02N	R21E	31	LOT 02	39.16
T06N	R25E	01	LOT 03	160.00
T01S	R22E	07	SE¼SW¼	40.00
T01S	R22E	27	SE¼SE¼	40.00
T01S	R22E	27	W½NE¼	80.00
T01S	R22E	28	SW¼SW¼	40.00
T01S	R22E	33	S½NW¼	80.00
T01S	R23E	01	LOT 09	40.00
T01S	R23E	01	LOT 10	40.00
T01S	R23E	01	LOT 11	40.00
T01S	R23E	01	LOT 12	40.00
T01S	R23E	06	LOT 08	40.00
T01S	R23E	12	W½SW¼	80.00
T01S	R23E	13	NE¼NE¼	40.00
T01S	R23E	35	NE¼NE¼	40.00
T01S	R23E	35	SW¼	160.00
T01S	R23E	35	SW¼SE¼	40.00
T01S	R24E	18	LOT 01	39.38
T01S	R24E	18	LOT 02	39.44
T01S	R24E	19	NE¼SE¼	40.00
T01S	R24E	20	SE¼SW¼	40.00
T01S	R24E	20	SW¼SE¼	40.00
T01S	R24E	21	NW¼SW¼	40.00
T01S	R24E	34	NW¼	160.00
T02S	R21E	22	N½	320.00
T02S	R21E	23	N½	320.00
T02S	R21E	24	NW¼SW¼	40.00
T02S	R21E	24	N½	320.00
T02S	R21E	33	N½N½	160.00
T02S	R21E	33	S½S½	160.00
T02S	R22E	11	NE¼NW¼	40.00
T02S	R22E	11	NW¼NE¼	40.00
T02S	R22E	11	SW¼SW¼	40.00
T02S	R22E	12	S½N½	160.00
T02S	R23E	02	LOT 01	40.06
T02S	R23E	03	LOT 01	40.14
T02S	R23E	03	LOT 02	40.13
T02S	R23E	03	LOT 03	40.08
T02S	R23E	03	NW¼SE¼	40.00
T02S	R23E	03	NW¼SW¼	40.00
T02S	R23E	03	S½S½	160.00
T02S	R24E	08	NW¼SW¼	40.00
T02S	R24E	17	NE¼NW¼	40.00
T02S	R24E	17	N½NE¼	80.00
T02S	R24E	19	LOT 01	39.54
T02S	R24E	32	E½NE¼	80.00
T10S	R23E	03	W½NE¼SW¼SW¼	05.00

TOTAL - DeBaca County 6,007.21

GUADALUPE

Township/Range		Sec.		Acres
T03N	R17E	01	LOT 02	39.85
T03N	R17E	01	LOT 03	39.75
T03N	R17E	01	LOT 04	39.65
T03N	R17E	01	SE¼NE¼	40.00
T03N	R17E	04	LOT 01	39.41
T03N	R17E	04	LOT 02	39.43
T03N	R17E	04	LOT 03	39.45
T03N	R17E	04	LOT 04	39.47
T03N	R17E	04	S½N½	160.00

TABLE A10-1 (continued)

PUBLIC LANDS PROPOSED FOR DISPOSAL

Township/Range		Sec.		Acres
T03N	R18E	17	E½SW¼	80.00
T03N	R18E	18	W½NW¼SE¼	20.00
T03N	R18E	18	W½SE¼NW¼	20.00
T03N	R18E	19	SE¼NE¼	40.00
T04N	R17E	19	E½SE¼	80.00
T04N	R17E	21	SE¼NE¼	40.00
T04N	R17E	21	S½SE¼	80.00
T04N	R17E	27	S½NW¼	80.00
T04N	R17E	29	S½	320.00
T05N	R21E	13	SE¼SE¼	40.00
T05N	R21E	23	NW¼NE¼	40.00
T05N	R21E	23	N½SE¼	80.00
T05N	R21E	23	SW¼SE¼	40.00
T05N	R21E	25	SW¼NW¼	40.00
T05N	R21E	25	W½SW¼	80.00
T05N	R21E	26	S½	320.00
T05N	R21E	27	S½S½	160.00
T06N	R18E	12	SW¼NE¼	40.00
T06N	R18E	12	SW¼SE¼	40.00
T06N	R18E	12	W½NW¼	80.00
T06N	R18E	15	SE¼NE¼	40.00
T06N	R18E	24	S½	320.00
T06N	R18E	24	S½N½	160.00
T06N	R19E	30	E½	320.00
T06N	R19E	30	E½SW¼	80.00
T06N	R19E	30	NE¼NW¼	40.00
T06N	R19E	31	LOT 01	38.40
T06N	R19E	31	LOT 02	38.00
T06N	R19E	31	LOT 03	37.60
T06N	R19E	31	LOT 04	37.20
T07N	R18E	18	LOT 02	43.60
T07N	R18E	18	NW¼SE¼	40.00
T07N	R18E	18	SE¼NW¼	40.00
T07N	R18E	18	SW¼NE¼	40.00
T07N	R18E	20	E½E½	160.00
T07N	R18E	20	E½W½	160.00
T07N	R18E	20	NW¼SE¼	40.00
T07N	R18E	20	SW¼SE¼	40.00
T07N	R18E	21	SE¼SW¼	40.00
T07N	R18E	22	S½NW¼	80.00
T07N	R18E	30	LOT 04	42.27
T07N	R18E	30	SE¼	160.00
T07N	R18E	30	SE¼SW¼	40.00
T07N	R25E	35	SW¼	160.00
T07N	R25E	35	W½SE¼	40.00
TOTAL - Guadalupe County				4,434.08

LINCOLN COUNTY

Township/Range		Sec.		Acres
T01N	R16E	08	SE¼NE¼	40.00
T01N	R16E	21	NE¼SW¼	40.00
T01N	R16E	21	SE¼	160.00
T01N	R16E	21	S½SW¼	80.00
T01N	R16E	22	NE¼SE¼	40.00
T01N	R16E	22	N½	320.00
T01N	R16E	22	SW¼	160.00
T01N	R16E	22	S½SE¼	80.00
T01N	R16E	23	ALL	640.00
T01N	R16E	25	ALL	640.00
T01N	R16E	26	ALL	640.00
T01N	R17E	10	N½SW¼	80.00
T01N	R17E	10	S½NW¼	80.00
T01N	R17E	19	LOT 01	39.69
T01N	R17E	19	LOT 02	39.83
T01N	R17E	19	LOT 03	39.96
T01N	R17E	19	LOT 04	39.13
T01N	R17E	19	E½NW¼	80.00
T01N	R17E	19	E½SW¼	80.00
T01N	R17E	19	NE¼	160.00
T01N	R17E	19	SE¼	160.00
T01N	R17E	20	E½	320.00
T01N	R17E	20	N½NW¼	80.00
T01N	R17E	20	SW¼	160.00
T01N	R17E	20	SW¼NW¼	40.00
T01N	R17E	23	NE¼	160.00
T01N	R17E	23	N½SE¼	80.00
T01N	R17E	23	SE¼NW¼	40.00
T01N	R17E	23	SW¼	160.00
T01N	R17E	23	W½NW¼	80.00
T01N	R17E	29	ALL	640.00
T01N	R17E	30	LOT 01	40.16
T01N	R17E	30	LOT 02	40.06
T01N	R17E	30	LOT 03	39.95
T01N	R17E	30	LOT 04	39.85
T01N	R17E	30	E½	320.00
T01N	R17E	30	E½W½	160.00
T01N	R19E	04	SE¼SW¼	40.00
T01N	R19E	06	LOT 03	39.85
T01N	R19E	06	NW¼SE¼	40.00
T01N	R19E	06	SW¼NE¼	40.00
T01N	R19E	09	W½SW¼	80.00
T01N	R19E	23	NE¼NW¼	40.00
T01N	R19E	23	NW¼SE¼	40.00
T01N	R19E	23	SW¼NE¼	40.00
T01N	R19E	26	NE¼NW¼	40.00
T01N	R19E	31	LOT 04	40.04
T01N	R19E	31	SE¼SW¼	40.00
T01N	R19E	31	S½SE¼	80.00
T01N	R19E	33	SW¼SW¼	40.00
T01N	R19E	35	SW¼SE¼	40.00
T01S	R13E	26	W½SW¼	80.00
T01S	R14E	09	NW¼SE¼	40.00
T01S	R14E	14	NW¼NW¼	40.00
T01S	R14E	20	S½NW¼	80.00
T01S	R14E	24	NE¼NE¼	40.00
T01S	R14E	24	S½SW¼	80.00
T01S	R14E	30	LOT 01	40.30
T01S	R14E	30	LOT 02	40.27
T01S	R17E	05	LOT 04	35.90
T01S	R17E	05	SW¼NW¼	40.00
T01S	R17E	35	E½SE¼	80.00
T01S	R18E	05	LOT 01	31.75
T01S	R18E	05	LOT 02	32.05
T01S	R18E	05	LOT 03	32.35
T01S	R18E	05	LOT 04	32.65
T01S	R18E	05	S½	320.00
T01S	R18E	05	S½N½	160.00
T01S	R18E	06	SE¼	160.00
T01S	R18E	13	W½SW¼	80.00
T01S	R18E	14	E½SE¼	80.00
T01S	R18E	17	ALL	640.00
T01S	R18E	18	LOT 01	48.39
T01S	R18E	18	LOT 02	48.37
T01S	R18E	18	LOT 03	48.35
T01S	R18E	18	LOT 04	48.33
T01S	R18E	18	E½	320.00
T01S	R18E	18	E½W½	160.00
T01S	R18E	19	SE¼SW¼	40.00
T01S	R18E	20	E½SW¼	80.00
T01S	R18E	20	N½	320.00
T01S	R18E	20	SE¼	160.00
T01S	R18E	21	NE¼	160.00
T01S	R18E	21	NW¼NW¼	40.00
T01S	R18E	21	S½	320.00
T01S	R18E	21	S½NW¼	80.00
T01S	R19E	07	LOT 03	44.75
T01S	R19E	15	NE¼NE¼	40.00
T01S	R19E	15	NW¼	160.00
T01S	R19E	15	W½NE¼	80.00
T01S	R19E	18	E½NW¼	80.00
T01S	R19E	18	NE¼	160.00
T01S	R19E	30	W½NE¼	80.00
T02S	R10E	12	E½SW¼	80.00
T02S	R10E	13	SE¼NW¼	40.00
T02S	R10E	34	NE¼NE¼	40.00
T02S	R10E	34	NW¼	160.00
T02S	R10E	34	N½SW¼	80.00
T02S	R10E	34	SW¼SW¼	40.00
T02S	R10E	35	NE¼	160.00
T02S	R11E	28	S½	320.00
T02S	R12E	02	NW¼SW¼	40.00
T02S	R12E	10	NE¼SE¼	40.00
T02S	R15E	13	SE¼NE¼	40.00
T02S	R15E	13	SW¼SE¼	40.00
T02S	R15E	13	S½SW¼	80.00
T02S	R15E	17	SW¼SW¼	40.00
T02S	R15E	18	S½SE¼	80.00
T02S	R15E	21	SW¼SW¼	40.00
T02S	R15E	24	NW¼SW¼	40.00
T02S	R15E	25	NE¼NW¼	40.00
T02S	R15E	25	SW¼	160.00
T02S	R15E	25	S½NW¼	80.00
T02S	R15E	26	E½SE¼	80.00
T02S	R16E	09	N½	320.00
T02S	R16E	19	E½E½	160.00
T02S	R16E	19	SW¼NE¼	40.00
T02S	R16E	31	LOT 01	37.28
T02S	R16E	31	LOT 02	37.20
T02S	R16E	31	LOT 03	37.12
T02S	R16E	31	LOT 04	37.04
T02S	R16E	31	E½SW¼	80.00
T02S	R16E	31	SE¼	160.00
T02S	R18E	01	SW¼SW¼	40.00
T02S	R18E	11	NW¼SE¼	40.00
T02S	R18E	11	W½NE¼	80.00
T03S	R10E	17	ALL	640.00
T03S	R10E	18	LOT 01	31.19
T03S	R10E	18	LOT 02	31.71
T03S	R10E	18	LOT 03	31.23
T03S	R10E	18	LOT 04	31.75
T03S	R10E	18	E½	320.00
T03S	R10E	18	E½W½	160.00
T03S	R10E	24	LOT 01	44.28
T03S	R10E	24	LOT 02	43.89
T03S	R10E	24	NW¼	160.00
T03S	R10E	24	W½NE¼	80.00
T03S	R10E	33	E½	320.00
T03S	R11E	24	NW¼SW¼	40.00
T03S	R11E	26	NW¼SW¼	40.00
T03S	R11E	26	W½NE¼	80.00

TABLE A10-1 (continued)

PUBLIC LANDS PROPOSED FOR DISPOSAL

Township/Range		Sec.		Acres	Township/Range		Sec.		Acres	Township/Range		Sec.		Acres
T03S	R11E	27	N½SE¼	80.00	T04S	R14E	22	S½NW¼	80.00	T06S	R10E	03	LOT 01	37.95
T03S	R11E	27	SW¼SE¼	40.00	T04S	R15E	01	LOT 04	40.09	T06S	R10E	03	LOT 02	37.98
T03S	R11E	33	NE¼SW¼	40.00	T04S	R15E	01	SW¼NW¼	40.00	T06S	R10E	03	LOT 03	38.01
T03S	R11E	33	N½SE¼	80.00	T04S	R15E	01	W½SW¼	80.00	T06S	R10E	03	LOT 04	38.03
T03S	R11E	33	SE¼SE¼	40.00	T04S	R15E	06	LOT 09	47.26	T06S	R10E	03	LOT 07	40.00
T03S	R12E	24	NE¼NW¼	40.00	T04S	R15E	30	NE¼SW¼	40.00	T06S	R10E	03	LOT 08	40.00
T03S	R12E	24	NW¼NE¼	40.00	T04S	R16E	07	SW¼SE¼	40.00	T06S	R10E	03	NW¼SW¼	40.00
T03S	R13E	18	LOT 01	41.81	T04S	R18E	21	NE¼SW¼	40.00	T06S	R10E	03	SE¼SE¼	40.00
T03S	R13E	18	LOT 02	41.92	T04S	R18E	21	W½E½	160.00	T06S	R10E	11	NE¼	160.00
T03S	R13E	18	E½NW¼	80.00	T05S	R10E	01	S½SE¼	80.00	T06S	R10E	12	N½	320.00
T03S	R13E	18	NE¼SW¼	40.00	T05S	R10E	05	SE¼SW¼	40.00	T06S	R10E	14	W½SW¼	80.00
T03S	R13E	18	N½SE¼	80.00	T05S	R10E	08	NW¼NW¼	40.00	T06S	R10E	15	E½NE¼	80.00
T03S	R13E	23	N½NW¼	80.00	T05S	R10E	09	S½SW¼	80.00	T06S	R10E	23	W½	320.00
T03S	R13E	23	SE¼NW¼	40.00	T05S	R10E	12	N½	320.00	T06S	R10E	26	NW¼	160.00
T03S	R13E	25	ALL	640.00	T05S	R10E	12	N½S½	160.00	T06S	R11E	07	LOT 03	39.69
T03S	R13E	29	NE¼NW¼	40.00	T05S	R10E	33	E½	320.00	T06S	R11E	08	SW¼SW¼	40.00
T03S	R13E	29	NW¼NE¼	40.00	T05S	R11E	03	SE¼SW¼	40.00	T06S	R11E	25	LOT 24	20.34
T03S	R13E	30	SW¼NE¼	40.00	T05S	R11E	07	LOT 03	34.15	T06S	R11E	25	LOT 44	8.99
T03S	R15E	03	LOT 01	40.27	T05S	R11E	19	SE¼SE¼	40.00	T06S	R12E	25	LOT 01	39.99
T03S	R15E	03	LOT 02	40.26	T05S	R13E	09	W½SE¼	80.00	T06S	R12E	36	NE¼SW¼	40.00
T03S	R15E	03	S½NE¼	80.00	T05S	R13E	13	NE¼	160.00	T06S	R13E	01	LOT 01	18.81
T03S	R15E	19	SE¼NE¼	40.00	T05S	R13E	31	NE¼SE¼	40.00	T06S	R13E	01	LOT 02	19.15
T03S	R15E	20	N½SW¼	80.00	T05S	R13E	31	SE¼NE¼	40.00	T06S	R13E	30	LOT 03	42.22
T03S	R15E	23	NE¼NE¼	40.00	T05S	R14E	03	SE¼	160.00	T06S	R14E	01	LOT 01	19.00
T03S	R15E	23	SE¼SE¼	40.00	T05S	R14E	06	SE¼SW¼	40.00	T06S	R14E	01	LOT 02	18.98
T03S	R15E	26	S½	320.00	T05S	R14E	10	NE¼	160.00	T06S	R14E	01	LOT 03	18.98
T03S	R15E	27	NW¼SE¼	40.00	T05S	R14E	10	S½	320.00	T06S	R14E	01	LOT 04	18.98
T03S	R15E	33	W½SW¼	80.00	T05S	R14E	19	SE¼NE¼	40.00	T06S	R14E	06	LOT 04	18.62
T03S	R15E	34	N½SE¼	80.00	T05S	R14E	19	SW¼	160.00	T06S	R14E	27	SW¼SW¼	40.00
T03S	R15E	34	SE¼NW¼	40.00	T05S	R14E	25	LOT 02	44.84	T06S	R15E	06	LOT 03	59.10
T03S	R15E	34	S½NE¼	80.00	T05S	R14E	25	LOT 04	45.40	T06S	R15E	21	N½NE¼	80.00
T03S	R17E	11	E½NW¼	80.00	T05S	R15E	04	LOT 01	39.46	T06S	R15E	28	SW¼NW¼	40.00
T03S	R17E	33	W½NW¼	80.00	T05S	R15E	20	NW¼SE¼	40.00	T06S	R16E	01	LOT 01	14.43
T03S	R18E	10	SE¼	160.00	T05S	R15E	20	SW¼NE¼	40.00	T06S	R16E	01	LOT 08	40.00
T03S	R18E	15	NE¼SE¼	40.00	T05S	R15E	25	SW¼NE¼	40.00	T06S	R17E	04	LOT 04	29.55
T03S	R18E	15	SE¼NE¼	40.00	T05S	R15E	28	N½SW¼	80.00	T06S	R17E	04	SE¼SW¼	40.00
T04S	R11E	04	LOT 01	39.56	T05S	R15E	28	SE¼SW¼	40.00	T06S	R17E	06	LOT 12	44.88
T04S	R11E	04	SE¼NE¼	40.00	T05S	R15E	29	NE¼SE¼	40.00	T06S	R17E	06	LOT 13	44.88
T04S	R11E	20	S½	320.00	T05S	R15E	30	E½SE¼	80.00	T06S	R17E	06	LOT 14	44.88
T04S	R11E	21	N½SE¼	80.00	T05S	R15E	33	NE¼NW¼	40.00	T06S	R17E	29	E½SE¼	80.00
T04S	R11E	21	SE¼NW¼	40.00	T05S	R15E	33	NE¼SW¼	40.00	T06S	R17E	29	SE¼NE¼	40.00
T04S	R11E	21	SW¼	160.00	T05S	R15E	33	SW¼NE¼	40.00	T06S	R18E	10	NE¼NW¼	40.00
T04S	R11E	22	N½	320.00	T05S	R16E	11	N½SW¼	80.00	T06S	R18E	20	SW¼NE¼	40.00
T04S	R11E	23	N½NW¼	80.00	T05S	R16E	17	SE¼	160.00	T06S	R18E	21	E½	320.00
T04S	R11E	28	NW¼	160.00	T05S	R16E	17	SE¼SW¼	40.00	T06S	R18E	21	E½W½	160.00
T04S	R11E	33	W½SW¼	80.00	T05S	R16E	17	S½NE¼NE¼	20.00	T06S	R18E	21	NW¼NW¼	40.00
T04S	R12E	01	NW¼SE¼	40.00	T05S	R16E	24	E½NE¼	80.00	T06S	R18E	23	S½NW¼	80.00
T04S	R12E	01	N½SW¼	80.00	T05S	R16E	24	NW¼SW¼	40.00	T06S	R18E	28	E½NE¼	80.00
T04S	R12E	13	SE¼	160.00	T05S	R16E	24	SW¼NE¼	40.00	T06S	R18E	28	NE¼SE¼	40.00
T04S	R12E	17	E½SE¼SW¼SW¼	5.00	T05S	R16E	28	S½SW¼	80.00	T06S	R18E	28	NW¼NE¼	40.00
T04S	R12E	17	SE¼SW¼	40.00	T05S	R16E	31	S½SE¼	80.00	T06S	R18E	29	SW¼SE¼	40.00
T04S	R12E	19	NW¼SW¼NE¼	10.00	T05S	R19E	26	NW¼	160.00	T06S	R19E	20	NW¼NW¼	40.00
T04S	R12E	19	S½SE¼NE¼	20.00	T05S	R19E	27	NW¼SW¼	40.00	T06S	R19E	29	S½SW¼	80.00
T04S	R12E	19	W½NE¼SW¼NE¼	5.00	T05S	R19E	27	SW¼NW¼	40.00	T06S	R20E	03	SW¼	160.00
T04S	R12E	20	E½NE¼SW¼NW¼	5.00	T05S	R19E	28	NE¼SE¼	40.00	T06S	R20E	04	LOT 02	29.65
T04S	R12E	20	E½NW¼	80.00	T05S	R19E	28	SE¼NE¼	40.00	T06S	R20E	04	LOT 04	29.99
T04S	R12E	20	E½NW¼NW¼	10.00	T05S	R19E	34	SW¼NW¼	40.00	T06S	R20E	04	W½SE¼	80.00
T04S	R12E	20	S½SW¼NW¼	20.00	T05S	R19E	34	W½SW¼	80.00	T06S	R20E	04	W½SW¼	80.00
T04S	R12E	29	NE¼SE¼	40.00	T06S	R09E	11	E½SW¼	80.00	T06S	R20E	17	SW¼SW¼	40.00
T04S	R12E	32	NE¼NE¼	40.00	T06S	R09E	27	SE¼NW¼	40.00	T06S	R20E	18	LOT 04	44.72
T04S	R13E	24	S½	320.00	T06S	R09E	27	SE¼SW¼	40.00	T06S	R20E	18	SE¼SE¼	40.00
T04S	R13E	24	W½NW¼	80.00	T06S	R09E	28	NE¼NE¼	40.00	T07S	R09E	01	N½NW¼	80.00
T04S	R13E	26	SE¼SW¼	40.00	T06S	R09E	28	N½SW¼	80.00	T07S	R11E	05	LOT 01	39.91
T04S	R13E	26	S½SE¼	80.00	T06S	R09E	28	SE¼SE¼	40.00	T07S	R14E	14	SE¼NE¼	40.00
T04S	R13E	34	SW¼NW¼	40.00	T06S	R09E	28	S½NW¼	80.00	T07S	R14E	15	NE¼NW¼	40.00
T04S	R14E	08	SW¼NE¼	40.00	T06S	R10E	01	S½S½	160.00	T07S	R17E	08	SW¼NW¼	40.00

TABLE A10-1 (continued)

PUBLIC LANDS PROPOSED FOR DISPOSAL

Township/Range		Sec.		Acres	Township/Range		Sec.		Acres	Township/Range		Sec.		Acres
T07S	R18E	12	E½NW¼	80.00	T09S	R15E	25	S½NW¼	80.00	T10S	R20E	21	E½NW¼	80.00
T07S	R18E	12	N½SW¼	80.00	T09S	R19E	05	SE¼SE¼	40.00	T10S	R20E	21	NE¼SW¼	40.00
T07S	R18E	12	SW¼SW¼	40.00	T09S	R19E	05	S½SW¼	80.00	T10S	R20E	21	NW¼SE¼	40.00
T07S	R18E	18	SE¼NW¼	40.00	T09S	R19E	08	N½	320.00	T10S	R20E	30	SE¼NE¼	40.00
T07S	R18E	18	SW¼NE¼	40.00	T09S	R19E	08	SW¼	160.00	T10S	R20E	31	E½NE¼	80.00
T07S	R18E	20	W½NE¼	80.00	T09S	R19E	18	NE¼	160.00	T10S	R20E	33	SE¼NW¼	40.00
T07S	R18E	21	SE¼SW¼	40.00	T09S	R19E	19	NE¼NW¼	40.00	T10S	R20E	35	N½S½	160.00
T07S	R18E	25	NW¼SE¼	40.00	T09S	R20E	25	NE¼SE¼	40.00	T10S	R20E	35	S½N½	160.00
T07S	R19E	31	LOT 05	44.04	T10S	R09E	01	LOT 01	37.43	T11S	R18E	03	SW¼SW¼	40.00
T07S	R19E	31	LOT 06	44.44	T10S	R09E	03	LOT 01	39.15	T11S	R18E	09	NE¼SE¼	40.00
T07S	R19E	31	SW¼SE¼	40.00	T10S	R09E	03	LOT 02	39.20	T11S	R18E	10	NW¼NW¼	40.00
T07S	R19E	35	S½SW¼	80.00	T10S	R09E	03	LOT 03	39.26	T11S	R18E	11	NE¼	160.00
T07S	R20E	18	SW¼NE¼	40.00	T10S	R09E	03	LOT 04	39.31	T11S	R18E	11	SW¼NW¼	40.00
T07S	R20E	22	SW¼SW¼	40.00	T10S	R09E	03	E½SW¼	80.00	T11S	R18E	11	W½SW¼	80.00
T07S	R20E	27	NW¼NW¼	40.00	T10S	R09E	03	SE¼	160.00	T11S	R18E	14	NW¼NE¼	40.00
T07S	R20E	28	NE¼NE¼	40.00	T10S	R09E	03	SE¼NW¼	40.00	T11S	R18E	14	N½NW¼	80.00
T07S	R20E	34	N½SW¼	80.00	T10S	R09E	03	S½NE¼	80.00	T11S	R19E	14	LOT 05	41.03
T07S	R20E	34	S½NW¼	80.00	T10S	R09E	04	NE¼SW¼	40.00	T11S	R19E	15	NE¼SE¼SE¼	10.00
T08S	R13E	32	NE¼NW¼	40.00	T10S	R09E	04	S½SE¼	80.00	T11S	R19E	22	SE¼NW¼NE¼	10.00
T08S	R19E	03	LOT 01	39.91	T10S	R09E	06	SE¼	160.00	T11S	R20E	28	LOT 01	42.15
T08S	R19E	03	E½SE¼	80.00	T10S	R09E	09	NE¼SW¼	40.00	T12S	R18E	25	E½SE¼	80.00
T08S	R19E	03	SE¼NE¼	40.00	T10S	R09E	09	SE¼	160.00	T12S	R18E	25	SW¼NE¼	40.00
T08S	R19E	05	N½SW¼	80.00	T10S	R09E	09	S½N½	160.00	T12S	R19E	01	LOT 01	2.17
T08S	R19E	07	NE¼NW¼	40.00	T1CS	R09E	09	S½SW¼	80.00	T12S	R19E	01	LOT 02	5.27
T08S	R19E	10	E½NW¼	80.00	T10S	R09E	10	NW¼	160.00	T12S	R19E	03	LOT 05	10.43
T08S	R19E	10	SW¼NW¼	40.00	T10S	R09E	10	NW¼SW¼	40.00	T12S	R19E	03	LOT 06	13.00
T08S	R19E	18	LOT 01	47.46	T10S	R09E	10	S½S½	160.00	T12S	R19E	04	LOT 07	30.15
T08S	R19E	18	NE¼NW¼	40.00	T10S	R09E	10	W½NE¼	80.00	T12S	R19E	07	LOT 05	38.97
T08S	R19E	18	NW¼NE¼	40.00	T10S	R09E	15	N½	320.00	T12S	R19E	07	LOT 06	33.71
T08S	R19E	18	SE¼SW¼	40.00	T10S	R09E	15	SW¼	160.00	T12S	R19E	07	LOT 07	29.58
T08S	R19E	20	N½NE¼	80.00	T10S	R09E	15	S½SE¼	80.00	T12S	R19E	09	NE¼SW¼	40.00
T08S	R19E	31	LOT 01	46.43	T10S	R09E	22	NE¼NW¼	40.00	T12S	R19E	10	LOT 01	10.33
T08S	R20E	06	LOT 01	40.15	T10S	R09E	22	N½NE¼	80.00	T12S	R19E	10	LOT 02	10.40
T08S	R20E	06	LOT 02	40.10	T10S	R09E	22	N½S½	160.00	T12S	R19E	20	LOT 01	37.99
T08S	R20E	06	LOT 03	40.06	T10S	R09E	22	SW¼NE¼	40.00	T12S	R19E	25	LOT 03	38.39
T08S	R20E	06	LOT 04	43.48	T10S	R09E	22	S½NW¼	80.00	T12S	R19E	25	LOT 04	38.33
T08S	R20E	06	SE¼NW¼	40.00	T10S	R09E	22	S½SE¼	80.00	T12S	R19E	25	LOT 05	38.27
T08S	R20E	06	S½NE¼	80.00	T10S	R17E	24	SW¼SW¼	40.00	T12S	R19E	25	LOT 06	38.21
T09S	R08E	34	W½NE¼	80.00	T10S	R18E	01	NE¼SE¼	40.00	T12S	R19E	25	LOT 07	41.58
T09S	R09E	19	LOT 01	39.21	T10S	R18E	01	SE¼NE¼	40.00	T12S	R19E	25	LOT 08	41.82
T09S	R09E	19	LOT 02	39.24	T10S	R18E	04	LOT 03	40.43	T12S	R19E	25	LOT 09	42.00
T09S	R09E	19	LOT 03	39.27	T10S	R18E	04	LOT 04	40.54	T12S	R19E	25	LOT 10	44.09
T09S	R09E	19	E½	320.00	T10S	R18E	05	SE¼NE¼	40.00	T12S	R19E	26	LOT 03	38.29
T09S	R09E	19	E½NW¼	80.00	T10S	R18E	10	NE¼NW¼	40.00	T12S	R19E	26	LOT 04	38.31
T09S	R09E	19	NE¼SW¼	40.00	T10S	R18E	10	N½NE¼	80.00	T12S	R19E	26	LOT 05	38.35
T09S	R09E	20	SW¼	160.00	T10S	R18E	11	N½N½	160.00	T12S	R19E	26	LOT 06	38.37
T09S	R09E	20	W½SE¼	80.00	T10S	R18E	22	NW¼SW¼	40.00	T12S	R19E	26	LOT 07	35.97
T09S	R09E	22	LOT 01	38.15	T10S	R18E	22	N½SE¼	80.00	T12S	R19E	26	LOT 08	35.69
T09S	R09E	22	LOT 02	38.14	T10S	R18E	22	SW¼SE¼	40.00	T12S	R19E	26	NE¼SW¼	40.00
T09S	R09E	22	LOT 03	37.96	T10S	R18E	26	NW¼	160.00	T12S	R19E	26	SE¼	160.00
T09S	R09E	22	LOT 04	37.21	T10S	R18E	27	SE¼NE¼	40.00	T12S	R19E	27	LOT 01	38.49
T09S	R09E	22	LOT 05	34.92	T10S	R19E	01	E½SW¼	80.00	T12S	R19E	27	LOT 02	38.56
T09S	R09E	22	LOT 06	36.71	T10S	R19E	01	NW¼SE¼	40.00	T12S	R19E	27	LOT 03	34.02
T09S	R09E	22	LOT 07	37.42	T10S	R19E	01	SE¼NW¼	40.00	T12S	R19E	27	LOT 04	33.12
T09S	R09E	22	LOT 08	37.52	T10S	R19E	01	SW¼NE¼	40.00	T12S	R19E	27	LOT 05	44.30
T09S	R09E	22	LOT 09	36.91	T10S	R19E	04	LOT 03	40.48	T12S	R19E	28	LOT 02	46.62
T09S	R09E	22	LOT 10	36.68	T10S	R19E	08	E½E½	160.00	T12S	R19E	28	LOT 03	48.47
T09S	R09E	22	LOT 11	36.23	T10S	R19E	08	NW¼SE¼	40.00	T12S	R19E	28	LOT 04	48.70
T09S	R09E	27	LOT 01	34.46	T10S	R19E	08	NW¼SW¼	40.00	T12S	R19E	28	SW¼NW¼	40.00
T09S	R09E	27	LOT 02	35.04	T10S	R19E	08	W½NW¼	80.00	T12S	R19E	29	LOT 01	41.98
T09S	R09E	28	S½NE¼	80.00	T10S	R19E	13	E½SE¼	80.00	T12S	R19E	29	LOT 02	42.02
T09S	R09E	29	NW¼NE¼	40.00	T10S	R19E	24	S½N½	160.00	T12S	R19E	29	LOT 03	42.10
T09S	R09E	29	W½	320.00	T10S	R20E	09	NE¼	160.00	T12S	R19E	29	LOT 04	33.22
T09S	R09E	30	E½NW¼	80.00	T10S	R20E	09	SE¼SW¼	40.00	T12S	R19E	30	LOT 07	43.06
T09S	R09E	30	NE¼	160.00	T10S	R20E	09	S½SE¼	80.00	T12S	R19E	30	LOT 08	43.81
T09S	R09E	30	NE¼SE¼	40.00	T10S	R20E	15	SE¼NW¼	40.00	T12S	R19E	30	LOT 09	52.94

TABLE A10-1 (continued)

PUBLIC LANDS PROPOSED FOR DISPOSAL

Township/Range		Sec.		Acres	Township/Range		Sec.		Acres	Township/Range		Sec.		Acres
T12S	R19E	30	LOT 10	29.26	T13S	R19E	15	N½NE¼	80.00	T13S	R20E	08	LOT 02	35.06
T12S	R19E	30	LOT 11	29.14	T13S	R19E	15	N½S½	160.00	T13S	R20E	08	LOT 03	53.77
T12S	R19E	31	LOT 02	13.15	T13S	R19E	15	SW¼SE¼	40.00	T13S	R20E	08	LOT 04	32.85
T12S	R19E	31	LOT 03	07.12	T13S	R19E	15	S½N½	160.00	T13S	R20E	08	N½	320.00
T12S	R19E	31	LOT 05	36.95	T13S	R19E	15	S½SW¼	80.00	T13S	R20E	09	LOT 01	13.55
T12S	R19E	31	LOT 06	35.48	T13S	R19E	17	ALL	640.00	T13S	R20E	09	LOT 02	26.59
T12S	R19E	31	LOT 07	35.36	T13S	R19E	18	LOT 01	37.96	T13S	R20E	16	LOT 01	33.59
T12S	R19E	31	LOT 08	29.18	T13S	R19E	18	LOT 02	37.90	T13S	R20E	16	LOT 02	34.92
T12S	R19E	31	LOT 09	29.23	T13S	R19E	18	LOT 03	37.83	T13S	R20E	16	LOT 03	20.71
T12S	R19E	31	LOT 10	42.64	T13S	R19E	18	LOT 04	37.77	T13S	R20E	16	LOT 04	43.38
T12S	R19E	31	LOT 11	42.52	T13S	R19E	19	LOT 04	38.03	T13S	R20E	17	LOT 01	39.32
T12S	R19E	31	LOT 12	44.40	T13S	R19E	21	NE¼NW¼	40.00	T13S	R20E	17	LOT 02	26.40
T12S	R19E	31	LOT 13	33.56	T13S	R19E	22	LOT 01	37.09	T13S	R20E	17	LOT 03	26.40
T12S	R19E	34	LOT 02	33.20	T13S	R19E	22	LOT 03	38.07	T13S	R20E	17	LOT 04	33.04
T12S	R19E	34	LOT 03	44.14	T13S	R19E	22	LOT 04	38.46	T13S	R20E	17	N½S½	160.00
T12S	R19E	34	LOT 04	38.93	T13S	R19E	22	LOT 05	37.57	T13S	R20E	17	SE¼NE¼	40.00
T12S	R19E	34	LOT 05	34.16	T13S	R19E	22	LOT 06	38.18	T13S	R20E	17	S½SE¼	80.00
T12S	R19E	34	LOT 06	33.15	T13S	R19E	22	LOT 08	37.40	T13S	R20E	18	LOT 05	38.65
T12S	R19E	34	LOT 07	41.00	T13S	R19E	24	N½S½	160.00	T13S	R20E	18	LOT 06	32.89
T12S	R19E	34	LOT 08	41.15	T13S	R19E	24	W½NW¼	80.00	T13S	R20E	18	LOT 07	39.35
T12S	R19E	34	LOT 09	41.22	T13S	R19E	25	NE¼SE¼	40.00	T13S	R20E	18	NE¼SE¼	40.00
T12S	R19E	35	LOT 01	39.47	T13S	R19E	25	NE¼SW¼	40.00	T13S	R20E	18	S½SE¼	80.00
T12S	R19E	35	LOT 04	35.48	T13S	R19E	25	SE¼NE¼	40.00	T13S	R20E	19	LOT 05	40.91
T12S	R19E	35	LOT 04	35.48	T13S	R19E	25	SE¼NW¼	40.00	T13S	R20E	19	LOT 06	17.96
T12S	R19E	35	LOT 05	39.85	T13S	R19E	27	LOT 01	37.09	T13S	R20E	19	LOT 08	22.33
T12S	R19E	35	LOT 05	39.85	T13S	R19E	27	LOT 02	36.63	T13S	R20E	19	LOT 09	22.31
T12S	R19E	35	LOT 06	39.83	T13S	R19E	27	LOT 03	36.18	T13S	R20E	19	LOT 12	22.29
T12S	R19E	35	LOT 06	39.83	T13S	R19E	27	LOT 06	36.34	T13S	R20E	20	LOT 03	22.45
T12S	R20E	01	LOT 09	38.61	T13S	R19E	27	LOT 07	36.78	T13S	R20E	20	LOT 04	39.40
T12S	R20E	01	LOT 10	38.43	T13S	R19E	27	LOT 08	37.24	T13S	R20E	20	LOT 05	50.43
T12S	R20E	22	LOT 07	34.64	T13S	R19E	27	LOT 09	37.39	T13S	R20E	20	NE¼NE¼	40.00
T12S	R20E	27	LOT 01	39.87	T13S	R19E	27	LOT 10	36.93	T13S	R20E	21	LOT 01	29.69
T12S	R20E	27	LOT 02	35.30	T13S	R19E	27	LOT 11	36.48	T13S	R20E	21	LOT 02	38.54
T12S	R20E	27	LOT 04	37.78	T13S	R19E	27	LOT 14	36.63	T13S	R20E	21	LOT 03	52.92
T12S	R20E	29	LOT 01	3.78	T13S	R19E	27	LOT 15	37.08	T13S	R20E	21	LOT 04	57.96
T12S	R20E	29	LOT 03	38.91	T13S	R19E	27	LOT 16	37.54	T13S	R20E	21	LOT 05	30.19
T12S	R20E	29	LOT 04	37.42	T13S	R19E	34	LOT 01	37.58	T13S	R20E	21	SE¼	160.00
T12S	R20E	29	LOT 06	39.40	T13S	R19E	34	LOT 02	37.14	T13S	R20E	22	LOT 01	18.73
T12S	R20E	29	LOT 07	39.97	T13S	R19E	34	LOT 03	36.80	T13S	R20E	22	LOT 02	32.76
T12S	R20E	29	SE¼SE¼	40.00	T13S	R19E	34	LOT 04	36.34	T13S	R20E	22	E½NW¼	80.00
T12S	R20E	30	LOT 12	39.08	T13S	R19E	34	LOT 05	36.34	T13S	R20E	22	SW¼	160.00
T12S	R20E	32	LOT 01	1.80	T13S	R19E	34	LOT 06	36.98	T13S	R20E	22	W½NE¼	80.00
T12S	R20E	32	LOT 02	3.00	T13S	R19E	34	LOT 07	37.08	T13S	R20E	24	SE¼SW¼	40.00
T12S	R20E	32	LOT 03	2.40	T13S	R19E	34	LOT 08	37.53	T13S	R20E	25	NW¼NE¼	40.00
T12S	R20E	34	NW¼NE¼	40.00	T13S	R19E	34	LOT 09	37.46	T13S	R20E	25	N½SE¼	80.00
T13S	R18E	12	S½	320.00	T13S	R19E	34	LOT 10	36.93	T13S	R20E	25	SE¼NE¼	40.00
T13S	R18E	13	NE¼SW¼	40.00	T13S	R19E	34	LOT 11	37.05	T13S	R20E	25	SE¼NW¼	40.00
T13S	R18E	13	SE¼	160.00	T13S	R19E	34	LOT 12	36.66	T13S	R20E	25	SW¼SW¼	40.00
T13S	R18E	13	SE¼NW¼	40.00	T13S	R19E	34	LOT 13	36.82	T13S	R20E	26	SW¼NE¼	40.00
T13S	R18E	13	S½NE¼	80.00	T13S	R19E	34	LOT 14	37.22	T13S	R20E	27	E½SW¼	80.00
T13S	R19E	01	LOT 01	39.94	T13S	R19E	34	LOT 15	36.89	T13S	R20E	27	NE¼NE¼	40.00
T13S	R19E	01	LOT 02	39.83	T13S	R19E	34	LOT 16	37.41	T13S	R20E	27	NE¼NE¼	40.00
T13S	R19E	01	LOT 03	39.72	T13S	R20E	06	LOT 08	12.46	T13S	R20E	27	NW¼NW¼	40.00
T13S	R19E	01	LOT 04	39.61	T13S	R20E	06	LOT 09	25.00	T13S	R20E	27	SE¼	160.00
T13S	R19E	01	S½	320.00	T13S	R20E	06	LOT 12	19.79	T13S	R20E	27	SE¼NW¼	40.00
T13S	R19E	01	S½N½	160.00	T13S	R20E	06	LOT 13	19.61	T13S	R20E	27	SW¼NE¼	40.00
T13S	R19E	07	LOT 03	37.95	T13S	R20E	06	E½SW¼	80.00	T13S	R20E	28	LOT 01	46.88
T13S	R19E	07	LOT 04	37.99	T13S	R20E	06	SW¼SE¼	40.00	T13S	R20E	28	LOT 02	16.78
T13S	R19E	07	E½SW¼	80.00	T13S	R20E	07	LOT 05	19.46	T13S	R20E	28	LOT 03	52.76
T13S	R19E	07	SE¼	160.00	T13S	R20E	07	LOT 06	19.34	T13S	R20E	28	LOT 05	52.59
T13S	R19E	08	SW¼	160.00	T13S	R20E	07	LOT 07	28.58	T13S	R20E	28	E½E½	160.00
T13S	R19E	08	W½SE¼	80.00	T13S	R20E	07	LOT 08	20.81	T13S	R20E	28	SE¼SE¼	40.00
T13S	R19E	09	E½	320.00	T13S	R20E	07	E½NW¼	80.00	T13S	R20E	29	LOT 01	22.42
T13S	R19E	10	ALL	640.00	T13S	R20E	07	NW¼NE¼	40.00	T13S	R20E	29	LOT 03	35.55
T13S	R19E	12	N½SW¼	80.00	T13S	R20E	07	S½NE¼	80.00	T13S	R20E	29	E½SE¼	80.00
T13S	R19E	15	NE¼NW¼	40.00	T13S	R20E	08	LOT 01	33.33	T13S	R20E	29	W½E¼	160.00

TABLE A10-1 (continued)

PUBLIC LANDS PROPOSED FOR DISPOSAL

Township/Range	Sec.	Acres	Township/Range	Sec.	Acres	Township/Range	Sec.	Acres
T13S R20E	30 LOT 05	22.29						
T13S R20E	30 LOT 07	22.13						
T13S R20E	30 LOT 08	22.31						
T13S R20E	30 LOT 09	53.31						
T13S R20E	31 N½NE¼SE¼	20.00						
T13S R20E	32 LOT 01	49.25						
T13S R20E	32 LOT 02	49.11						
T13S R20E	33 LOT 01	23.03						
T13S R20E	33 E½SE¼	80.00						
T13S R20E	33 NW¼NW¼	40.00						
T13S R20E	33 W½E½	160.00						
TOTAL - Lincoln County		55,910.69						

ACREAGE SUMMARY

Chaves County	37,324.51
DeBaca County	6,007.21
Guadalupe	4,434.08
Lincoln County	55,910.69
GRAND TOTAL	**103,676.49**

APPENDIX 11
DESIRED PLANT COMMUNITY

This appendix provides detailed information on the desired plant community (DPC) concept. It consists of five sections:

1. *Summary of the DPC development process.*
2. *Summary of Efforts to Establish Baseline Data on Vegetation*
3. *Data Collection Procedures for Percent Cover, Vegetative Cover by Percent Composition, Percent Basal Composition and Percent Composition by Weight*
4. *Procedures for using existing data.*
5. *Plant Community Type Descriptions*

SUMMARY OF THE DPC DEVELOPMENT PROCESS

In June, 1991, the Roswell Resource Area Office received draft guidance for determining and describing the Desired Plant Community under the Vegetative Management Initiative from the BLM's Washington Office. Shortly thereafter, an interdisciplinary resource team was established to review the guidance and begin developing the process to establish DPC.

Initially, the interdisciplinary team included the District Office resource specialists in range, wildlife, recreation, and fire. Resource specialists in range, wildlife, archeology, recreation and planning from both the Roswell Resource Area and the Carlsbad Resource Area were also included on the team. A general invitation was issued to all other employees who wished to participate.

The Roswell Resource Area (RRA) Wildlife Biologist reviewed the existing documents and determined that the resource area was made up of seven broad community types and two habitat descriptors. The RRA Range Conservationists also reviewed the 87 Ecological Range Site Guides for the resource area. They concluded that even though many differences existed that it would be possible to group the range sites into more manageable units, based on similarities of soils, slopes, geomorphic location, and general vegetative aspect (see Table A11-1). Once the units were agreed upon in general, meetings were scheduled to request comments and information from members of the public and from other natural resource agencies.

Once the communities (units) were established, range sites were drawn on over 200 USGS 7.5 minute topographic maps showing the public lands in the resource area. The range site lines created polygons which were computerized in the Geographic Information System (GIS), using codes to differentiate the ecological range sites and the Major Land Resource Areas in which they occurred. After all of the polygons were input and proofread for errors, the ecological sites were tagged by community type and mapped as one unit. With the help of this system, data such as acreage for each community, the land status within that community, and all of the locations for that community could be illustrated. (See Maps 3-9 and 3-10 for general locations of all the communities in the resource area.)

Once all of the ecological range sites were sorted by community type, more in-depth factors were reviewed to establish vegetative resource objectives.

TABLE A11-1
PLANT COMMUNITY TYPE DESCRIPTIONS AND DEVELOPMENT
COMPARISON OF HABITAT DESCRIPTIONS FOR SECTION OF REPRESENTATIVE COMMUNITY TYPE

East Roswell Grazing Environmental Statement	Standard Habitat Sites	Roswell Management Framework Plan Amendment
Riparian/Wetland	Riparian/Psuedoriparian	Riparian Salt Cedar Riparian Cottonwood
Pools & Riffles **Aquatic**		
Drainages/Draws/Canyons		Drainages & Bottomlands Canyon & Draws
Mixed Desert Shrub Creosote	Mixed Shrub Rolling Upland	Mixed Desert Shrublands
	Mixed Shrub Malpais Pinon/Juniper Malpais	
Shortgrass	Grass Rolling Upland Grass Hill Grass Flat	Grass Rolling Upland
Mesquite **Grasslands**	Mesquite Rolling Upland	
Shinery Oak/Dune		Shinnery Oak Mid-grass
	Juniper/Grass Sandhill **Pinon/Juniper**/Grass Hill	
Broadleaf Tree (Upland)	Cropland	Grainfields Escarpments **Special Habitat Features**

Note: Descriptions found in **Bold and Underlined Type** best represent a community type category (or habitat component category). For example, the six different descriptions for grasslands derived from the East Roswell Grazing Environment Statement, Standard Habitat Site descriptions and Roswell Management Framework Plan Amendment, are combined under one community type **Grasslands**.

The objectives relate to the kinds of vegetation and the manner in which it is measured, in terms most applicable to various resource management goals. Watershed specialists require data to be reported in terms of percent cover, wildlife specialists use data as vegetative cover by percent composition, and livestock vegetation requirements are generally reported in terms of percent composition by weight.

Ranges of the components of plant communities (e.g., grasses or forbs) were established by specialists in the Roswell Resource Area. These ranges describe in general terms the vegetation goals for each community in terms of percent cover, vegetative cover by percent composition and percent composition by weight. For example, in the grassland community, watershed goals for the grass/forbs component would range from a minimum cover of 15 percent to a maximum of 52 percent cover. Wildlife goals for the grassland community are that 30 to 45 percent of the vegetative cover by composition be of grasses and 15 percent consist of forbs. Livestock goals for the same community would be that grasses make up 60 to 90 percent and forbs 10 to 30 percent of the vegetative production by weight. All of these goals are obtainable in general for the grassland community. Each ecological range site in the grassland community can reach these goals, according to the Soil Conservation Service's (SCS) Ecological Range Site Guides, through either natural succession, management actions, or both.

The validity of these ranges of components was tested using monitoring data from allotments that were meeting a wide variety of interdisciplinary goals, such as wildlife cover, soil cover, and forage. The proposed ranges that did not accurately reflect the condition from these allotments were modified to ensure that the DPC goals reflected the desired objectives.

The ranges of plant components also serve as additional descriptive elements in describing a DPC. Pastures with a vegetative community outside the ranges of a given DPC would not necessarily be slated for treatment or a change in management, but being outside the range would be an important indicator. Pastures not conforming to DPC goals would be proposed for treatment only if approved by an interdisciplinary review team. The DPC for each community objectively describes what the vegetative landscape should resemble. Resource needs, threshold limits, professional judgement and interdisciplinary review ultimately will be the deciding factors in determining if treatment is required.

Threshold levels were developed by the interdisciplinary team to establish when a management action, such as a vegetation treatment, should be considered. Threshold levels are based on the Vegetative Description and Analysis Literature Reviews for various types of vegetation in the Roswell Resource Area and the SCS Ecological Range Site Guides. (These documents are available for review at the RRA office.) The thresholds indicate when various plant species reach a level considered to be undesirable within the community. Below these levels, plants may not be considered undesirable. These thresholds are in terms of either plants per acre, percent of the vegetative canopy, or percent by weight of vegetative production. The thresholds developed for mesquite, pinon and juniper include tree size in addition to plants per acre. Once threshold levels are exceeded, an interdisciplinary team would evaluate proposed treatments or other management options.

The accuracy of the ranges of components must be proved through use over a period of years and in a variety of pastures. As more information is developed, the vegetation management goals and component ranges may need to be adjusted. Additionally, the development of the process to establish DPCs clearly demonstrated the need for a more extensive vegetative monitoring strategy. The current data are effective in managing livestock grazing, but are inadequate for wildlife habitat management. Current monitoring strategies must be revised to reflect wildlife concerns. Additional transects and monitoring at different times of the year may be required.

SUMMARY OF EFFORTS TO ESTABLISH BASELINE DATA ON VEGETATION

Development of the DPC process is predicated on baseline data gathered in the Roswell Resource Area. The data gathered, and the techniques used to collect the data, were oriented primarily toward livestock grazing management. Major data gathering efforts are summarized here.

1977 - 79	Vegetation inventory and mapping of range sites on lands east of the Pecos River
1980 - 81	Monitoring studies established in key areas on all allotments east of the Pecos River identified for management emphasis in the land use plan. (Categorization was not in effect at this time, however most allotments would later be grouped in the "I" and "M" categories.)
1981 - 85	Mapping of the range sites on the lands west of the Pecos River
1983 - 86	Monitoring studies established in key areas on all "I" and "M" category allotments, and some "C" category allotments west of the Pecos River
1991	Approximately 103,000 acres of unclassified lands were inventoried and classified. These lands are scattered or isolated and fall into the "C" category.
1991 - 92	Range site mapping data for land in the Roswell Resource Area are automated.

DATA COLLECTION PROCEDURES FOR PERCENT COVER, VEGETATIVE COVER BY PERCENT COMPOSITION, PERCENT BASAL COMPOSITION AND PERCENT COMPOSITION BY WEIGHT

Baseline data used in developing DPC component ranges have been gathered since 1977. The inventory methods described below are used in gathering that data.

To determine Percent Cover: Pace-point study lines, containing 100 to 300 pace points are run at each permanent study location. The person running the study records what is at the tip of the right boot in one of the following categories: bare ground, litter, small rock (< 2 inches in diameter), large rock (> 2 inches in diameter), or a direct hit on some type of vegetation. If one of the first four categories is recorded then the "nearest plant" is also recorded by species. If there is a direct hit on vegetation the species is recorded. Each category is totalled, then divided by the total number of points recorded on that study, and multiplied by 100 to achieve percent ground cover. The resource specialist can then determine what percentage of the ground is bare soil, or covered by small or large rocks, litter or vegetation.

To determine Vegetative Cover by Percent Composition: The same information that was collected for Percent Cover is used to determine Vegetative Cover by Percent Composition. The different species of vegetation are grouped, regardless if they were a direct hit or recorded as a "nearest plant". Each individual species is divided by the total number of points recorded and multiplied by 100 to achieve the vegetative cover by percent composition. The specialist then can determine the species of vegetation that constitute ground cover in a specific area and the percentages in which they occur on that site.

To determine Percent Basal Composition: In the Shinnery-Oak Dune Community, Percent Basal Composition for bluestems and shinnery-oak will be used to describe the DPC for meeting habitat requirements of the lesser prairie chicken. An inventory method called a four-armed study is used to gather data. A four-armed study consists of a total of 100 pace-points (25 per arm). The person running the study records what is at the tip of the right boot in one of the following categories: bare ground, litter, or a direct hit on some type of live plant base. If one of the first two categories is recorded then the "nearest plant ahead of the point" is also recorded by species. If there is a direct hit on vegetation, the species is recorded. At each third point, the height of the nearest of one of three grasses (sand bluestem, little bluestem, sand dropseed) is measured. Each category is then totalled, and divided by the total number of points recorded on that study and multiplied by 100 to achieve percent basal cover. The resource specialist can then determine what percentage of the ground is bare soil, covered by litter or by vegetation.

To determine Percent Composition by Weight: Production studies are run at each permanent study location. Studies contain between 10 and 30 vegetation plots that are each 3.2 square feet along transects with 100 to 300 pace points. Each study has from one to three transects. Each plant located within the plot must first be identified as a grass, forb or shrub, and then by species. The individual plant must then be weighed, or its weight estimated, and recorded. After all the transects on the study are run, the green weights for each plant are totaled and averaged, multiplied by the dry weight, and then multiplied by 20 to achieve pounds per acre. These weights are transferred to a production condition work sheet and are arrayed by range site description. All of the plant weights are totaled by group (forb, grass or shrub) and a gross total weight is calculated. Each individual species weight is then divided into the gross total and multiplied by 100 to achieve percent composition by weight.

To determine Range Condition: The percentages calculated in Percent Composition by Weight are compared to the percentages of total annual herbage production presented as composition of the potential plant community in the Soil Conservation Service Range Site Descriptions. The composition for each site in the range site descriptions is called the allowable percentage. In the comparison, the present percentage of composition by weight is selected if less than or equal to the allowable percentage in the range description. If the present percentage exceeds the allowable percentage, then the allowable percentage is used. To arrive at a range condition rating, the selected percentages of either the allowable or present composition by weight for each species is totalled. If the rating falls between 0 and 25, range condition is considered to be poor. If the rating falls between 26 and 50, range condition is fair; between 51 and 75, it is good. If the rating is between 76 and 100, the range condition is considered to be excellent. These condition categories are related to seral stages: poor is equivalent to early seral; fair equates to mid-seral, good is equivalent to late seral, and excellent is comparable to climax.

DATA ANALYSIS PROCEDURE

The Roswell District uses the Soil Conservation Service Ecological Site Inventory methodology to collect and analyze monitoring data. The Roswell Resource Area has more than 10 years of monitoring data on grazing allotments.

The most current individual study data were reviewed and entered into the BLM's standard Inventory Data System Utility (IDSU) program using the following procedure.

1. Each study was assigned a Site Write-Up Area (SWA) designation number. This number is unique and can be correlated to the year the data were collected. Established studies represent the key areas (ecological range sites) in pastures; these studies should be representative for the existing vegetative community.

The existing vegetative study data were entered into the IDSU program using the SWA numbers as shown below:

SWA Series	Collection Year	Data
A	Inventory of Unclassified lands	1991
C	Eastside "C" allotments	1977-78
D	Eastside "I" & "M" allotments	1989-90
E	Westside allotments	1987-88
F	Westside allotments	1991-92

2. Species production (dry weight) was taken from the resource area's automated production work sheet. The species production for each SWA was rounded to the nearest pound; all species with dry weights of less than 1 pound were rounded to 1. The IDSU program automatically calculates total production and species composition.

3. The Ecological Range Site and seral stage (or range condition in terms of poor, fair, good, excellent) for each SWA were taken from the resource area's automated production data work sheet and entered into the IDSU database.

4. Public land acreage for each SWA was calculated by taking the percent of public lands within the allotment and multiplying this factor by the total acreage covered by the study plot. Further refinement of acreage will occur when additional themes (allotments and pasture boundaries) are automated.

5. Studies within the same range site are grouped together to provide a broad overview of the existing vegetation community for that particular range site. Plant lists for the existing vegetative composition were developed from the study data for each ecological range site and are available for review at the Roswell Resource Area Office.

The IDSU program provides a means to group and analyze site specific data, but it lacks the means to adequately portray the data in summary form. To accomplish this task a separate database (in a dBase format) was developed to provide data summaries.

The existing vegetative composition for each community type can displayed as follows:

1. Public land acres can be displayed by Seral classification (range condition rating) for each ecological range site within each community type.

2. Existing vegetative composition for each community type can be broadly displayed and categorized by percent of forbs, grasses, shrubs and trees.

PLANT COMMUNITY TYPE DESCRIPTIONS

For the purpose of this RMP, the variously described habitat types from two previous land use plans/EISs were grouped into 7 broad community types and 2 habitat descriptors, based on comparisons between habitat types, standard habitat sites, and habitat descriptors (refer to Table A11-1).

A **community type** is an aggregation of all plant communities with similar structure and floristic composition, representing a composite of similar ecological range sites. (See Table A11-2, at the end of this appendix.) Aquatic and special habitat features are not community types by definition and are referred to as habitat descriptors.

The basic capacity of rangeland to produce vegetation and the various combinations of species and life forms possible on a given location is determined primarily by climate and soil properties. Given a general climatic pattern, soil properties are thought to reflect the integrated effects of topographic position, geologic substrate, geomorphic history and land use history, which determine the ability of the land to supply moisture and nutrients to plants. Recognition of land (or ecosystem) units which differ significantly in their ability to produce either kind or amount of vegetation is fundamental for predicting the response of vegetation to drought, fire, grazing and other natural factors and management practices.

An Ecological Site Inventory documents the basis for establishing realistic, achievable, and measurable vegetation management objectives.

Ecological site is defined as a kind of land with specific physical characteristics which differs from other kinds of land in its ability to produce distinctive kinds and amounts of vegetation, and in its response to management.

Vegetation management objectives are established in RMPs; they are called resource condition objectives (RCO). Resource condition objectives for vegetation are in general terms and are described as kinds, types, amounts or appearance of vegetation that will provide the goods, values, and services needed on a geographic area. The RCOs described in the RMP are normally not very specific. Resource condition objectives developed in the RMP are usually based on generalized attributes of sites with similar vegetation attributes, response attributes or similar uses. Specific objectives for monitoring, activity plan development, or management of sensitive areas, are usually based on specific site capabilities and management goals.

The description of a **Desired Plant Community** contains the percentage of vegetative species needed to meet the vegetation objectives of a detailed activity plan, such as in coordinated resource management plans, reclamation plans, or habitat management plans. The DPC must be within a site's or area's capability to meet the objectives through natural succession, management actions or both. The description may include plant species, production, cover or other attributes such as aspect, landscape, or color. The DPC objectives in activity plans should be as specific and measurable as necessary to provide direction for management and to ensure meaningful monitoring and evaluation. The DPC has a direct relationship to resolving local issues, as well as broader issues, such as biodiversity, global climate change, and control of undesirable plant species and noxious weeds.

Approximately 87 different range sites may occur within the Resource Area. The community types selected for this RMP are identifiable by the distinct vegetation, landform, soils and representative wildlife species. Community types are intermingled throughout the Resource Area. The seven community types and two habitat descriptors for the Roswell Resource Area are:

- Riparian/Wetland
- Drainages/Draws/Canyons
- Mixed Desert Shrub
- Mixed Shrub Malpais
- Grasslands
- Shinnery Oak/Dune
- Pinon/Juniper

- Aquatic
- Special Habitat Features

The following are general descriptions of the community types and habitat descriptors used in this resource management plan.

Riparian/Wetland Community Type (RIP)

Riparian and wetland areas are lands directly influenced by permanent surface or subsurface water. These lands have visible vegetation or physical characteristics reflective of permanent water influence. Lake shores and stream banks are typical riparian areas.

The various types of riparian/wetland areas found in the resource area are classified as either riverine, lacustrine or palustrine systems (USFWS 1979). The riverine system include the Rio Bonito, Salado Creek, Pecos River, Hondo River and intermittent drainages. The lacustrine system includes playa lakes and alkali (salt) lakes. Palustrine systems include the naturally occurring Overflow Wetlands, beaver ponds and earthen tanks.

Springs and seeps, sinks, and drainages with riparian vegetation are also considered to be riparian areas. Many of these smaller water bodies are considered special habitat features, as well.

Riparian/wetland communities are found at elevations from 2,500 feet to 6,500 feet, and on slopes of generally less than 3 percent. The size of a riparian area varies from the immediate vegetation found at a spring to an entire floodplain of a particular stream reach.

Riparian areas along the Pecos River are primarily composed of salt cedar, scattered cottonwood, seep willow, sedges, vine mesquite, and grasses such as giant and alkali sacaton. Along the Rio Bonito, the overstory is composed of box elder, black walnut, willow and cottonwood. Vegetation along other major drainages may be composed of little leaf sumac, desert willow, hackberry, walnut, apache plume, and sacaton grasses.

Wetland habitats are typically marshy, found within the floodplain of streams or rivers, and have shallow open water. The soils are usually inundated for a long period of time. Wetlands may occur naturally through surface and subsurface water flow, be created by beaver activity, or be created by man-made structures such as diversions or impoundments. Dominant species include inland saltgrass, cattail, sedge and pondweed. The primary wildlife habitat consideration is self-evident. These areas, along with the aquatic habitat type, are the most fragile and limited of the types.

Approximately 71 percent (348) of the total wildlife species found in the resource area use this community type for all or part of their life cycle. A high diversity of plant species can be found in riparian areas when compared to the adjacent upland sites. The presence of water and the vegetative diversity is the primary wildlife habitat features.

Drainages/Draws/Canyons Community Type (DDC)

The primary consideration in listing range sites under this community type is topography influenced by drainage of water from adjacent sites. Examples include steep to very steep slope faces of mesas or canyons, gently sloping to moderately steep canyon walls, hillsides, and bottoms of broad major drainages.

The resource area is dissected by many drainages due to the influence of the Sierra Blanca and Capitan Mountains to the west and the Llano Estacado to the east. These drainages are also referred to as arroyos, draws, canyons and xeroriparian areas. These watersheds eventually drain into the Pecos River, which bisects the resource area from north to south.

This community type supports a more varied vegetation composition than the surrounding communities. This community type is directly influenced by runoff from seasonal storms (usually summer and winter) with brief, intermittent flows. This type is found in all of the other community types, but to a lesser extent in the Mixed Shrub Malpais and Shinnery Oak/Dune community types. This type may also support riparian areas but may not be influenced by permanent water.

Drainages, draws and canyons are an important component of wildlife habitat in the resource area due to the variety of vegetation and because the provide natural pathways between upland and lowlands. Approximately 24 percent (116) of wildlife species in the resource area use this community type.

Mixed Desert Shrub Community Type (MDS)

The primary consideration in listing range sites under this community type is topography influenced by drainages, fans, and mesas with shrubs and half-shrubs comprising from 10 to 35 percent of the potential plant community.

The mixed desert shrub type occurs from gently sloping, undulating terrain to breaks and escarpments which are rough, broken and dissected by drainages. Elevations range from 2,500 feet to 4,100 feet. This type is found scattered throughout the resource area intermingled with a short- or mid-grass habitat type.

Vegetation in this community is somewhat sparse and is comprised of desert grasses, shrubs and cacti. Forbs can become abundant following periods of rainfall. The predominant shrub species include creosote, mesquite, tarbush, saltbush, little leaf sumac, and sage. Common cacti encountered are claret cup, cholla, prickly pear and eagle claw. Forbs include plantain, globe mallow, and buckwheat. Grasses include fluffgrass, sideoats grama, black grama, dropseed and galleta.

Mixed Shrub Malpais Community Type (MSM)

The primary consideration in listing range sites under this community type is topography influenced by volcanic activity, and the presence of lava flows and basalt outcrops with a mixture of shrubs and half-shrubs.

This unique type is found only at the Carrizozo Lava Flow. The topography and land form are strongly influenced by the south-trending gradient of the Tularosa Valley floor. Elevations range from 4,500 feet at the southern tip to 5,676 feet at Little Black Peak cinder cone. The area is composed of broken and cracked basalt lava beds, lava tubes and pressure ridges. There are actually two types of Malpais habitat in the lava flow, which differ in the amount of pinon and juniper present. The aspect vegetation is juniper, pinon pine, little leaf sumac, cholla, yucca, fourwing saltbush, red barberry, broom snakeweed and galleta grass.

Approximately 10 percent (51) of the wildlife species in the resource area use this community type. The primary wildlife habitat feature is lava.

Grasslands Community Type (SG)

The primary consideration in listing range sites under this community type is the flat to moderately rolling topography with 75 percent and higher composition of grasses in the description of potential plant community.

Grassland is the climax vegetative aspect for large portions of the resource area. The grassland community type is the most widespread. It can be further subdivided into grass rolling upland, grass hill, grass flat, and mesquite grassland subtypes, depending on topographic relief or seral stage. In many areas the subtypes may overlap. For the purpose of the RMP, the subtypes are grouped into the grassland community type. Vegetation is primarily dominated by warm season short- and mid-grasses. Large areas of grassland climax communities have dropped in successional stage due to misuse and have become a dis-climax mixed shrub community.

The grass rolling uplands is the predominant shortgrass habitat subtype in the resource area. It is found on broad, nearly level or gently undulating plains to rolling hills at elevations between 3800 feet to 5000 feet. Slopes are 0 to 9 percent. Vegetation is dominated by blue grama, black grama, galleta, tobosa, sideoats grama, dropseeds, muhlys, three-awns, burrograss and fluffgrass.

Woody shrub species are scarce but include mesquite, fourwing saltbush, wolfberry, sumac, and cactus species such as yucca and cholla. Invasions of broom snakeweed, a halfshrub, is common in some areas. Forbs are a minor component of the subtype except following periods of rainfall. Ground cover may be too sparse in much of this subtype to provide the cover requirements of certain small mammals or ground-nesting birds.

Grass hills are found primarily on hills, low mountains, or lower foot slopes of higher mountains. Slopes are rolling to steep and average about 25 percent. Elevations range from 4500 feet to 6000 feet. Short- and mid-grasses dominate this subtype, including hairy grama, fluffgrass, three-awn, and red lovegrass. Shrubs, halfshrubs and cacti include little leaf sumac, beargrass, ocotillo, hedgehog cactus, cholla and broom snakeweed. The structured diversity of the vegetation in this subtype provides more diverse bird nesting habitat than adjacent grasslands. This is the preferred habitat for mule deer, which also use the brushy draws for browse and cover.

The grass flats subtype occurs on nearly level to gently sloping upland plains as broad swales between uplands, or as isolated pockets in shallow depressions, playas, along drainages or in sinks. These areas receive significant runoff from adjacent sites, which produces more dense and taller vegetation. Vegetation is dominated by mid- and tall-grasses with occasional shrubs or half shrubs. The primary grasses are tobosa and galleta, which may occur on large expanses between upland sites, and alkali and giant sacaton, which usually are found along drainages or in depressions. Shrubs sparsely associated with the sacaton type are mesquite and fourwing saltbush. A few scattered yuccas or cholla may be interspersed in the tobosa swales. Forb diversity and abundance is low due to the density of the grass cover.

The mesquite grassland type could best be described as a dis-climax stage in a desert shortgrass climax. The mesquite invasion results from disturbance of natural successional processes. The type is generally located between the grassy plains and the Pecos River, including the breaks adjacent to the floodplain. Terrain is level to gently undulating with slopes generally less than 5 percent, or hummocky with numerous sand dunes scattered throughout the area. The elevation varies from 3,000 feet to 6,000 feet.

Mesquite is found on most soil types, but the main invasion occurs on sandy soils. The predominant shrub is honey mesquite, which has invaded what at one time was a shortgrass dominated type. Few other shrub species are associated with mesquite, although some creosote, yucca and Opuntia occur. Vegetation is dominated by black gama, blue grama, dropseed, muhly, tobosa and galleta, fluffgrass, and alkali sacaton on undulating terrain, with higher percentages of dropseed, three-awn and muhly on sandy sites. Halfshrubs include sand sage and broom snakeweed. Forbs may be abundant following periods of rainfall.

Grasslands is the most widespread of the community types found in the resource area. Approximately 30 percent (149) of the wildlife species found in the resource area use this community type.

Shinnery Oak/Dune Community Type (SOD)

The primary consideration in listing range sites under this community type is topography influenced by aeolian and alluvial sedimentation on upland plains forming hummocks, dunes, sand ridges and swales, and the presence of shinnery oak in the description of potential plant community.

This is a unique community type found primarily below the Llano Estacado, or Staked Plains, in an area known as Mescalero Sands. It lies in the southern desert plains ecosystem between the elevations of 4,100 feet and 4,300 feet. The topography is gently sloping and undulating sandy plains, with moderate to very steep hummocky dunes of up to ten feet and more in height scattered throughout the area. Some of the dunes are stabilized with vegetation, while a number of them are unstable and shifting. Dunes blowouts with shinnery oak and bluestem, either isolated or in dune complexes, characteristic of the sand country.

The aspect vegetation is shinnery oak and bluestem. The deep sand community is a unique ecological area dominated by tall- and mid- grasses in a shortgrass ecosystem. The southern desert plains is characterized by such grasses as black grama, tobosa or galleta, and dropseed, but due to the sandy medium that occurs throughout the shinnery oak community, the dominant grasses are sand bluestem, little bluestem and three-awn.

In many areas, the shinnery oak community has shifted from a dominant sand bluestem/little bluestem/hairy grama grassland with varying amounts of shinnery oak, sand sage and yucca. Composition is now dominated by sand dropseed, red and purple three-awn and hairy grama, with increasing annual forbs, shinnery oak, mesquite, sand sage and yucca.

Approximately 15 percent (74) of the wildlife species in the resource area use this community type. The shinnery oak/dune community provides crucial habitat for the state endangered dune sagebrush lizard and the lesser prairie chicken.

Pinon/Juniper Community Type (PJ)

The primary consideration in listing range sites under this community type is topography influenced by higher hills and mountains with juniper, pinon or mountain mahogany in the description of the potential plant community.

The pinon/juniper community type is typically found in the mountain slopes and rolling foothills in the west half of the resource area. Smaller areas are scattered in the lower elevations, intermingled with the shortgrass habitat type. Slopes range from 15 to 75 percent, averaging 20 to 30 percent. The average elevation is from 4,500 feet to 7,500 feet.

The majority of the community type occurs at Fort Stanton, where an intermingling of several other habitat types can be found. These include the riparian/wetland, drainages/draws/canyons and grassland types. The overstory is dominated by one-seed juniper, pinon pine, and alligator juniper. Ponderosa pine can be found in protected canyons bottoms and along the Rio Bonito. The shrubby understory includes wavyleaf oak, little leaf sumac, mountain mahogany, algerita and fourwing saltbush. Forbs and grasses are represented by such species as wild buckwheat, sagewort, greenthread, sideoats grama, blue grama, creeping muhly, wolftail, fescue and wheatgrass.

Cedar Hills, a small area northwest of Roswell, is unique due to the vegetation and soil complex. The area reflects a combination of shinnery oak/dune and pinon/juniper types. Slopes are undulating and are frequently in the form of hummocks and low dunes. The elevation is 4,300 feet. The dominant aspect overstory is one-seed juniper and little leaf sumac, while the shrubby understory is comprised of shinnery oak and includes species such as beargrass, catclaw, broom snakeweed and cholla. Among the grasses are sand bluestem, little bluestem and sideoats grama.

Approximately 29 percent (143) of the wildlife species in the resource area use this community type. Faunal diversity is high, reflecting the vegetational and structural diversity of the pinon/juniper complex contribution to the diversity of wildlife species.

Aquatic Community Type

Aquatic habitat refers to the available open water associated with riparian/wetland areas. Aquatic habitats are typically found in the same areas described for Riparian/Wetland but not all riparian areas support aquatic habitats. This type varies in size from small pools of water associated with a spring to several miles of a stream reach. Important aquatic vegetation include algae, watercress and pondweed with an overstory of riparian vegetation as described above. Approximately 12 percent (59) of the wildlife species in the resource area are totally dependent on aquatic habitat. Many threatened or endangered fish and snails are dependent upon the quantity and quality of this limited habitat type.

Special Habitat Features (SHF)

Special habitat features are natural features, such as geological anomalies or aquatic sites, and manmade structures, which are a specific component of a habitat site requiring special consideration. The feature usually has an effect on animal species present and may affect wildlife positively or negatively. Wildlife use of a feature in a habitat site is a primary consideration. If the feature has no effect on any wildlife species present in those habitats, it is not considered a special habitat feature.

Examples of special habitat features include caves, springs, seeps, sink holes, beaver dams, prairie chicken booming grounds, small natural ponds, tree groves, exclosures, power poles, rock cairns, recreation areas, windmills, stock water tanks, and artificial wildlife waters.

TABLE A11-2
ECOLOGICAL RANGE SITES, BY COMMUNITY

Riparian/Wetland (RIP)

Range site descriptions are being developed for riparian-wetland areas throughout the West with oversight from the National Soil-Range Team comprised of BLM and the USDA Soil Conservation Service personnel.

Drainages/Draws/Canyons (DDC)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Bottomland	070BY056NM	BTLDCP2
	Breaks (N Exp)	070BY059NM	BRNCP2
	Breaks (S Exp)	070BY060NM	BRSCP2
	Clayey	070BY053NM	CLCP2
	Shallow Sandstone	070BY072NM	SHSNDSTCP2
	Saline	070BY058NM	SLCP2
CP-3	Bottomland	070CY103NM	BTLDCP3
	Breaks	070CY115NM	BRCP3
	Salty Bottomland	070CY118NM	SBTLDCP3
	Salt Flats	070CY111NM	SFCP3
	Swale	070CY101NM	SWCP3
CP-4	Draw	070DY155NM	DRCP4
	Swale	070DY154NM	SWCP4
SD-2	Bottomland	042BY018NM	BTLDSD2
	Draw	042BY016NM	DRSD2
SD-3	Bottomland	042CY017NM	BTLDSD3
	Draw	042CY008NM	DRSD3
	Salt Flats	042CY036NM	SFSD3
	Salt Meadows	042CY028NM	SMSD3
	Salty Bottomland	042CY033NM	SBTLDSD3
HP-2	Saline	070BY058NM	SLCP2
HP-3	Saline	070BY058NM	SLCP2
AN-3	Mountain Valley	039CY052NM	MVAN3
	Breaks	99999999NM	BR

TABLE A11-2 (con't.)
ECOLOGICAL RANGE SITES, BY COMMUNITY

Mixed Shrub Malpais (MSM)

	Range Site Name	SCS No.	Range Abbrev.
CP-3	Malpais	070CY110NM	MCP3
SD-2	Malpais	042BY037NM	MSD2

Shinnery Oak/Dune (SOD)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Deep Sand	070BY063NM	DSCP2
	Sandhills	070BY061NM	SDHCP2
	Sandy Plains	070BY055NM	SDYPCP2
SD-3	Deep Sand	042CY005NM	DSSD3
	Loamy Sand	042CY003NM	LOSSD3
	Sandhills	042CY022NM	SDHSD3
HP3	Deep Sand	077CY058NM	DSHP3
	Loamy Sand	077CY052NM	LOSHP3
	Sandhills	077CY057NM	SDHHP3
	Sandy Plains	077CY056NM	SDYPHP3

Pinon/Juniper (PJ)

	Range Site Name	SCS No.	Range Abbrev.
CP-3	Deep Sand Savannah	070CY123NM	DSSCP3
	Gravelly	070CY119NM	GRVCP3
	Hills	070CY106NM	HCP3
	Limestone Hills	070CY107NM	LSHCP3
	Sandstone Hills	070CY117NM	STHCP3
	Shallow Limestone	070CY102NM	SHLSCP3
	Shallow Sandstone	070CY116NM	SHSTCP3
	Shallow Limy Savannah	070CY121NM	SHLISCP3
	Shallow Sandy Savannah	070CY122NM	SHSSCP
CP-4	Limestone Hills	070DY151NM	LSHCP4
AN-3	Mountain Grassland	039CY050NM	MGAN3
	Mountain Meadow	039CY051NM	MTMDOAN3

TABLE A11-2 (con't.)
ECOLOGICAL RANGE SITES, BY COMMUNITY

Mixed Desert Shrub (MDS)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Gravelly	070BY065NM	GRVCP2
	Gyp Hills	070BY067NM	GHCP2
	Red Shale	070BY071NM	RSCP2
CP-4	Gravelly	070DY156NM	GRVCP4
	Very Shallow	070DY158NM	VSHCP4
SD-2	Gravelly	042BY010NM	GRVSD2
	Gravelly Loam	042BY035NM	GRVLOSD2
	Gravelly Sand	042BY024NM	GRVSSD2
	Gyp Hills	042BY013NM	GHSD2
	Hills	042BY027NM	HSD2
	Limestone Hills	042BY021NM	LSHSD2
	Limy	042BY019NM	LISD2
SD-3	Gravelly	042CY001NM	GRVSD3
	Gyp Hills	042CYO13NM	GHSD3
	Shallow	042CY025NM	SHSD3

Grasslands (GR)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Gyp Upland	070BY066NM	GUCP2
	Gyp Hills	070BY067NM	GHCP2
	Limy	070BY068NM	LICP2
	Loamy	070BY052NM	LOCP2
	Shallow Sand	070BY062NM	SHSCP2
	Sandy Loam	070BY054NM	SDYLOCP2
	Shallow	070BY075NM	SHCP2
	Swale	070BY057NM	SWCP2

TABLE A11-2 (con't.)
ECOLOGICAL RANGE SITES, BY COMMUNITY

Mixed Shrub Malpais (MSM)

	Range Site Name	SCS No.	Range Abbrev.
CP-3	Malpais	070CY110NM	MCP3
SD-2	Malpais	042BY037NM	MSD2

Shinnery Oak/Dune (SOD)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Deep Sand	070BY063NM	DSCP2
	Sandhills	070BY061NM	SDHCP2
	Sandy Plains	070BY055NM	SDYPCP2
SD-3	Deep Sand	042CY005NM	DSSD3
	Loamy Sand	042CY003NM	LOSSD3
	Sandhills	042CY022NM	SDHSD3
HP3	Deep Sand	077CY058NM	DSHP3
	Loamy Sand	077CY052NM	LOSHP3
	Sandhills	077CY057NM	SDHHP3
	Sandy Plains	077CY056NM	SDYPHP3

Pinon/Juniper (PJ)

	Range Site Name	SCS No.	Range Abbrev.
CP-3	Deep Sand Savannah	070CY123NM	DSSCP3
	Gravelly	070CY119NM	GRVCP3
	Hills	070CY106NM	HCP3
	Limestone Hills	070CY107NM	LSHCP3
	Sandstone Hills	070CY117NM	STHCP3
	Shallow Limestone	070CY102NM	SHLSCP3
	Shallow Sandstone	070CY116NM	SHSTCP3
	Shallow Limy Savannah	070CY121NM	SHLISCP3
	Shallow Sandy Savannah	070CY122NM	SHSSCP
CP-4	Limestone Hills	070DY151NM	LSHCP4
AN-3	Mountain Grassland	039CY050NM	MGAN3
	Mountain Meadow	039CY051NM	MTMDOAN3

TABLE A11-2 (con't.)
ECOLOGICAL RANGE SITES, BY COMMUNITY

Mixed Desert Shrub (MDS)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Gravelly	070BY065NM	GRVCP2
	Gyp Hills	070BY067NM	GHCP2
	Red Shale	070BY071NM	RSCP2
CP-4	Gravelly	070DY156NM	GRVCP4
	Very Shallow	070DY158NM	VSHCP4
SD-2	Gravelly	042BY010NM	GRVSD2
	Gravelly Loam	042BY035NM	GRVLOSD2
	Gravelly Sand	042BY024NM	GRVSSD2
	Gyp Hills	042BY013NM	GHSD2
	Hills	042BY027NM	HSD2
	Limestone Hills	042BY021NM	LSHSD2
	Limy	042BY019NM	LISD2
SD-3	Gravelly	042CY001NM	GRVSD3
	Gyp Hills	042CYO13NM	GHSD3
	Shallow	042CY025NM	SHSD3

Grasslands (GR)

	Range Site Name	SCS No.	Range Abbrev.
CP-2	Gyp Upland	070BY066NM	GUCP2
	Gyp Hills	070BY067NM	GHCP2
	Limy	070BY068NM	LICP2
	Loamy	070BY052NM	LOCP2
	Shallow Sand	070BY062NM	SHSCP2
	Sandy Loam	070BY054NM	SDYLOCP2
	Shallow	070BY075NM	SHCP2
	Swale	070BY057NM	SWCP2

TABLE A11-2 (con't.)
ECOLOGICAL RANGE SITES, BY COMMUNITY

Grasslands (GR) (con't.)

	Range Site Name	SCS No.	Range Abbrev.
CP-3	Deep Sand	070CY104NM	DSCP3
	Gyp Hills	070CY124NM	GHCP3
	Limy	070CY108NM	LICP3
	Loamy	070CY109NM	LOCP3
	Sandy	070CY112NM	SDYCP3
	Shallow	070CY113NM	SHCP3
	Shallow Plains	070CY120NM	SHPCP3
	Gyp Upland	070CY105NM	GUCP3
	Shallow Sandy	070CY114NM	SHSCP33
CP-4	Shallow	070DY152NM	SHCP4
	Loamy	070DY153NM	LOCP4
	Shallow Loamy	070DY159NM	SHLOCP4
SD-2	Clay	042BY023NM	CLSD2
	Deep Sand	042BY011NM	DSSD2
	Loamy	042BY014NM	LOSD2
	Sandy	042BY012NM	SDYSD2
	Shallow Sand	042BY015NM	SHSSD2
SD-3	Gyp Upland (SD2 & 3)	042CY006NM	GUSD3
	Limestone Hill	042CY020NM	LSHSD3
	Limy	042CY030NM	LISD3
	Loamy	042CY007NM	LOSD3
	Sandy	042CY004NM	SDYSD3
	Shallow Sandy	042CY002NM	SHSSD3
HP-2	Loamy	077BY026NM	LOHP2
	Shallow	077BY031NM	SHHP2
HP-3	High Lime	077CY060NM	HLIHP3
	Loamy	077CY053NM	LOHP3
	Sandy	077CY055NM	SDYHP3
	Shallow Sand	077CY051NM	SHSHP3
	Very Shallow	077CY054NM	VSHHP3
AN-3	Loamy	039CY056NM	LOAN3

NOTE: Range sites are not provided for the Aquatic and Special Habitat Features categories.

APPENDIX 12
ANTELOPE TRANSPLANT SUITABILITY CRITERIA

This appendix describes the criteria for determining if an area could accommodate an antelope transplant.

ANTELOPE TRANSPLANTS IN ROSWELL DISTRICT, NEW MEXICO

In 1979, New Mexico State University began a 4-year antelope habitat study. One of the objectives of this study was the evaluation of the suitability of the study pastures for stocking pronghorn. To apply these results to other pastures in the Roswell District, some index of suitability was needed. The following model was developed to predict the viability of a stocked pronghorn herd in a pasture fenced with net wire:

Viability Index = 1.082+(0.106)(X1)-(0.006)(X2)-(0.068)(X3)-(0.059)(X4)

Where:
X1 is number of forb species in fall
X2 is ruggedness index
X3 is pasture size in sections
X4 is anticipated average fall sheep stocking rate in animal units per section

The Land Surface Ruggedness Index (LSRI) was developed by Dr. Sam Beason and associates (1983) as a numerical tool to describe the topography of a pasture, rather than verbally describing it as "rugged," "rolling," etc. The ruggedness of the pasture has a negative influence on the Viability Index, i.e., the more rugged the pasture is - a higher LSRI - the less suitable the pasture is likely to be for pronghorn. The LSRI is determined simply by counting the number of line/dot intercepts when a 96-dot grid is randomly placed on a topographic map of the pasture.

The Viability Index can alternatively be interpreted as an index of suitability of the pasture for pronghorn populations. Pastures with a Viability Index less than 1.0 should not be stocked with pronghorn. Pastures with a Viability Index greater than 1.5 have a high probability for maintaining successful herds under normal conditions.

Criteria have been established by the Roswell District with concurrence of the New Mexico Department of Game Fish for determining whether a pasture is suitable for an antelope introduction:

1. Pastures must have a Viability Index equal to or greater than 1.5.
2. Land status within the pasture must be 50 percent or more State and/or public land.
3. Antelope will be stocked at three or four per section.
4. The sex ratio will be as close to four females per one buck as is feasible depending upon sex ratio of animals trapped.
5. Permittee will assure year-round water is available within the pasture.
6. Public access for hunting is available to the pasture.
7. Antelope passes from one pasture to another within the allotment will be allowed if agreeable to the permittee.
8. The NMDGF or the BLM will monitor the antelope numbers in the pasture during the summer through an aerial survey.

APPENDIX 13
ACEC RELEVANCE AND IMPORTANCE CRITERIA

This appendix describes how the five proposed areas of critical environmental concern (ACEC) meet the relevance and importance criteria.

FORT STANTON ACEC

The proposed Fort Stanton ACEC meets the BLM's relevance criteria because of the presence of Kuenzler's hedgehog cactus (*Echinocereus fenderleri* var. *kuenzleri*), a federal and state endangered species, significant caves, archaeological sites, and riparian/wetland habitat. The area meets the importance criteria because it has qualities that make it rare, unique and vulnerable to adverse change and require special management and protection.

OVERFLOW WETLANDS ACEC

Outside of the U.S. Fish and Wildlife Service's Bitter Lake National Wildlife Refuge to the north, the proposed Overflow Wetlands ACEC is one of the most important riparian areas in southeast New Mexico, and one of the best in the state. The naturally occurring Overflow Wetlands compliments man-made wetland habitats found on the Bitter Lake Refuge and the William S. Huey Waterfowl Management Area near Artesia, New Mexico.

The Overflow Wetlands meets the BLM's relevance criteria because of the presence of federal- and state-listed fish species, and the presence of riparian/wetland habitat. The area meets the importance criteria because it has qualities that make it rare, unique and vulnerable to adverse change and requires special management and protection.

MESCALERO SANDS ACEC

The proposed Mescalero Sands ACEC meets the BLM's relevance criteria because of the presence of the Dune Sagebrush Lizard (*Sceloporus graciousus arenicolous*), a state endangered species, booming grounds for the lesser prairie chicken, and a small population of white-tailed deer. One portion of the ACEC has been designated as an Outstanding Natural Area (ONA) by the BLM.

The entire Mescalero Sands area supports a relatively rare plant and animal community having much more than local significance. The Mescalero Sands ONA is highly recommended for ACEC designation because of the importance of the plant community, the unusual nature of the active sand dunes, and important habitat for a state endangered lizard species.

NORTH PECOS RIVER ACEC

The proposed Pecos River ACEC meets the BLM's relevance criteria because of the important biological values associated with the river, such as the presence of the Pecos Bluntnose Shiner (*Notropis simus pecosensis*), a federal and state endangered species, and pristine river conditions. The area is important due to the increasing population of mule deer, large groves of native Fremont cottonwoods, a small cattail marsh, low densities of salt cedar and large sacaton flats. The area offers great potential for riparian and wildlife habitat improvement.

ROSWELL CAVE COMPLEX ACEC

The Roswell Cave Complex ACEC consists of nine cave systems with a total acreage of 16,818 acres. The nine cave systems are: Angora-Corn, Bat Hole Cave, Coachwhip Cave, Crockett Cave, Crystal Caverns-Devils Well, Martin-Antelope Gyp, Millrace Cave, Torgac Cave and Zia Christine Cave.

Angora-Corn System

The Angora-Corn Cave System meets the relevance criteria for ACEC designation on the basis of cultural resources, natural process, wildlife habitat, and natural and human-influenced hazards. The cave system meets the importance criteria for ACEC designation on the basis of its regional and national significance and need for protection, its wildlife habitat, the concern for sensitive bat species and T & E species, and for reasons of safety and public welfare.

Bat Hole Cave

Bat Hole Cave meets the relevance criteria for ACEC designation based on its wildlife habitat,, the presence of T & E species, and because is it a natural hazard to wildlife, livestock and humans. Bat Hole Cave meets the importance criteria for ACEC designation on the basis of the regional and national significance of its bat habitat and population, concern for sensitive bat species, the need its protection, and for reasons of safety and public welfare.

Coachwhip Cave

Coachwhip Cave meets the relevance criteria for ACEC designation on the basis of natural processes (its formations and maze), and as a natural hazard. It meets the importance criteria for ACEC designation on the basis of the regional significance of its maze, the need for its protection, and for reasons of safety and public welfare.

Crockett Cave

Crockett Cave meets the relevance criteria for ACEC designation on the basis of natural processes (its boxwork, gypsum formations, geologic formation) and its bat habitat. It meets the importance criteria for ACEC designation on the basis of the regional (and possible national) significance of its boxwork, gypsum stalactites and other mineral specimens, concern for sensitive bat species, and the need for its protection.

Crystal Caverns-Devil's Well System

The Crystal Caverns System meets the relevance criteria for ACEC designation because of its cultural resources, wildlife habitat, T & E species, natural processes, and as a natural hazard to humans. The system meets the importance criteria for ACEC designation on the basis of the regional significance of its bat habitat and population, concern for sensitive bat species, regional and possible national significance for its cultural resources, national significance for its length and depth, the need for its protection, and for reasons of safety and public welfare.

Martin-Antelope Gyp System

The Martin-Antelope Gyp Cave System meets the relevance criteria for ACEC designation because of its cultural resources, wildlife habitat, T & E species, natural process and as a natural hazard to humans. The system meets the importance criteria for ACEC designation on the basis of the regional significance of its bat habitat, concern for sensitive bat species, possible national significance because of the presence of a cave-adapted salamander species, regional significance for its cultural resources, the need for its protection, and for reasons of safety and public welfare.

Millrace Cave

Millrace Cave meets the relevance criteria for ACEC designation on the basis of its natural process (method of formation, speleoclasts and relation to the youngest lava flow in the United States), and as a natural hazard. Millrace Cave meets the importance criteria for ACEC designation on the basis of its national significance (depth, formation, relation to the Carrizozo Lava Flow, and relation to the Little Black Peak and Carrizozo Lava Flow wilderness study areas), the need for its protection, and for reasons of safety and public welfare.

Torgac Cave

The Torgac Cave System meets the relevance criteria for ACEC designation on the basis of its worldwide significance as an example of natural processes (the formation of unique gypsum speleothems), cultural resources, its wildlife habitat, and presence of T &

E species. Torgac Cave meets the importance criteria for ACEC designation on the basis of its designation as a National Natural Landmark, concern for sensitive bat species, and the need for its protection.

Zia Christine Cave

Zia Christine Cave meets the relevance criteria for ACEC designation on the basis of natural process (unique and exceptional cave formations and tectonic influence), and as bat habitat. The cave meets the importance criteria for ACEC designation on the basis of its regional significance relative to geology and origin, concern for sensitive bat species, and its need for protection.

APPENDIX 14
ACEC MAPS

This appendix contains ACEC-specific maps that describe the changes in proposed management, by alternative, within each ACEC.

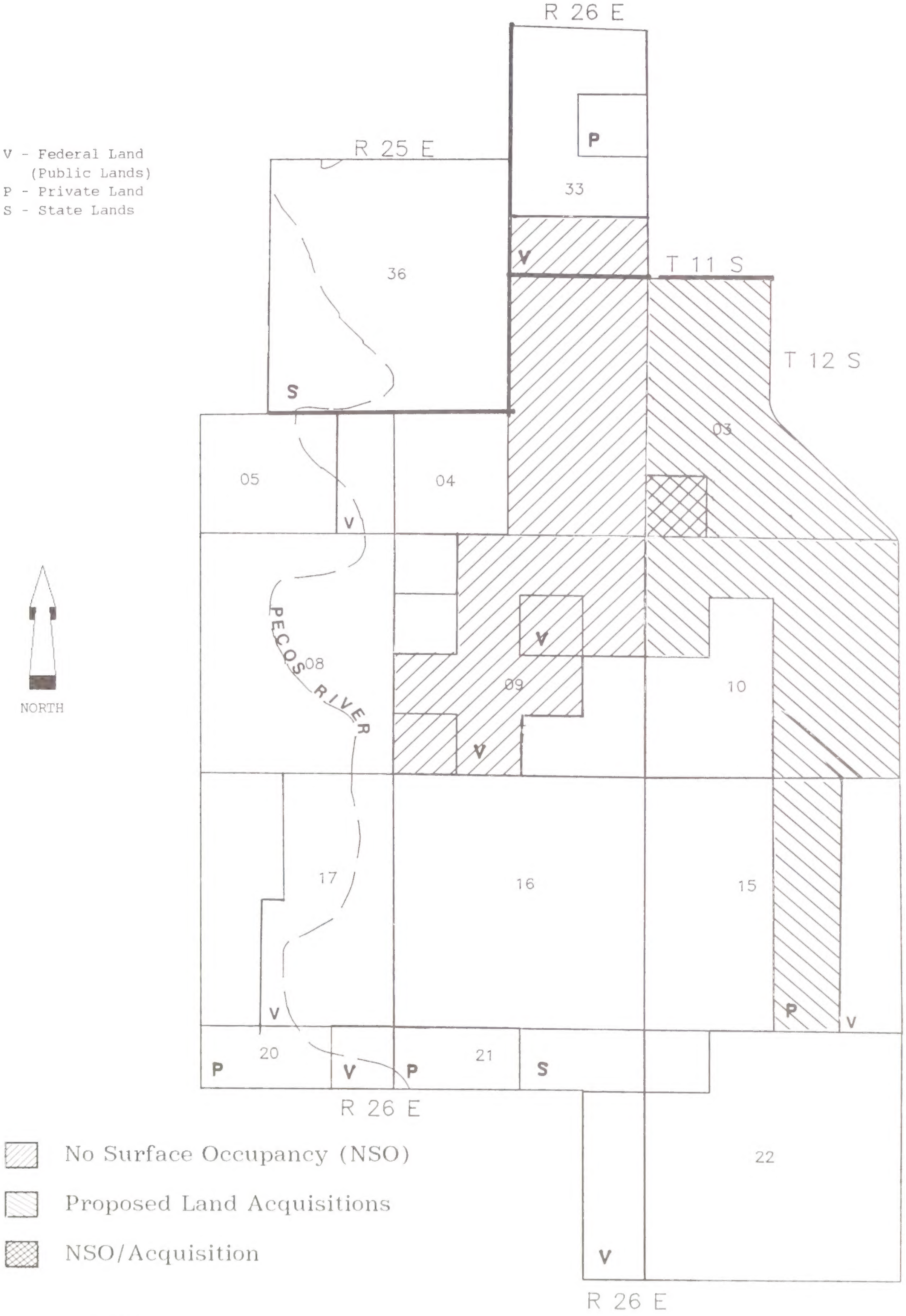
ACEC	MAP	TOPIC/ALTERNATIVE
Overflow Wetlands	A14-1	O&G Stips; Acquisitions/Alt. A
	A14-2	O&G Stips/Alts. B and D
	A14-3	Locatable, Solid, Salable mineral closures/Alts. B and D
	A14-4	OHV designations/Alts. B and D
	A14-5	O&G Stips/Alt. C
	A14-6	Locatable, Solid, Salable mineral closures/Alt. C
	A14-7	ROW exclusion and avoidance areas; OHV designations/Alt. C
	A14-8	Acquisitions/Alt. C
	A14-9	Livestock Grazing Adjustments/Alt. C
	A14-10	Acquisitions; ROW Exclusions; Livestock Grazing Adjustments/Alts. A, B, D, E
	A14-11	O&G Stips; Locatable, Solid, Salable mineral closures; OHV designations/Alt. E
North Pecos River	A14-12	O&G Stips./ Alts. B and E
	A14-13	O&G Stips./ Alts. C and D; Locatable, Solid Leasable Minerals/Alts. B, C, D, E; Salable Minerals/Alts. B and E
	A14-14	Solid Leasable Minerals/Alts. C, D
	A14-15	Acquisition; ROW exclusion areas/Alts. B, D; ROW avoidance areas/ Alts. C, E; OHV designations/Alts. B, C, D, E; Grazing adjustments/Alts B, D, E
Mescalero Sands	A14-16	O&G Stips./Alt. A
	A14-17	Locatable Minerals./Alt. A
	A14-18	ROW Exclusion Areas/Alt. A
	A14-19	Grazing restrictions/Alt. A; OHV designations/Alt. A
	A14-20	Minerals, Grazing, OHV restrictions/Alt. B
	A14-21	Acquisitions/Alt. B
	A14-22	O&G, ROW, Grazing, OHV restrictions/Alt. C
	A14-23	O&G, ROW, Grazing, OHV restrictions/Alt. D; Acquisitions/Alt. D
	A14-24	O&G, ROW, Grazing, OHV restrictions/Alt. E; Acquisitions/Alt. E
Fort Stanton	A14-25	Minerals, Grazing, OHV restrictions/Alt. A
	A14-26	Minerals, Grazing, ROW, Grazing restrictions/Alts. B, C, D, E

APPENDIX 14
ACEC MAPS

This appendix contains ACEC-specific maps that describe the changes in proposed management, by alternative, within each ACEC.

ACEC	MAP	TOPIC/ALTERNATIVE
Overflow Wetlands	A14-1	O&G Stips; Acquisitions/Alt. A
	A14-2	O&G Stips/Alts. B and D
	A14-3	Locatable, Solid, Salable mineral closures/Alts. B and D
	A14-4	OHV designations/Alts. B and D
	A14-5	O&G Stips/Alt. C
	A14-6	Locatable, Solid, Salable mineral closures/Alt. C
	A14-7	ROW exclusion and avoidance areas; OHV designations/Alt. C
	A14-8	Acquisitions/Alt. C
	A14-9	Livestock Grazing Adjustments/Alt. C
	A14-10	Acquisitions; ROW Exclusions; Livestock Grazing Adjustments/Alts. A, B, D, E
	A14-11	O&G Stips; Locatable, Solid, Salable mineral closures; OHV designations/Alt. E
North Pecos River	A14-12	O&G Stips./ Alts. B and E
	A14-13	O&G Stips./ Alts. C and D; Locatable, Solid Leasable Minerals/Alts. B, C, D, E; Salable Minerals/Alts. B and E
	A14-14	Solid Leasable Minerals/Alts. C, D
	A14-15	Acquisition; ROW exclusion areas/Alts. B, D; ROW avoidance areas/ Alts. C, E; OHV designations/Alts. B, C, D, E; Grazing adjustments/Alts B, D, E
Mescalero Sands	A14-16	O&G Stips./Alt. A
	A14-17	Locatable Minerals./Alt. A
	A14-18	ROW Exclusion Areas/Alt. A
	A14-19	Grazing restrictions/Alt. A; OHV designations/Alt. A
	A14-20	Minerals, Grazing, OHV restrictions/Alt. B
	A14-21	Acquisitions/Alt. B
	A14-22	O&G, ROW, Grazing, OHV restrictions/Alt. C
	A14-23	O&G, ROW, Grazing, OHV restrictions/Alt. D; Acquisitions/Alt. D
	A14-24	O&G, ROW, Grazing, OHV restrictions/Alt. E; Acquisitions/Alt. E
Fort Stanton	A14-25	Minerals, Grazing, OHV restrictions/Alt. A
	A14-26	Minerals, Grazing, ROW, Grazing restrictions/Alts. B, C, D, E

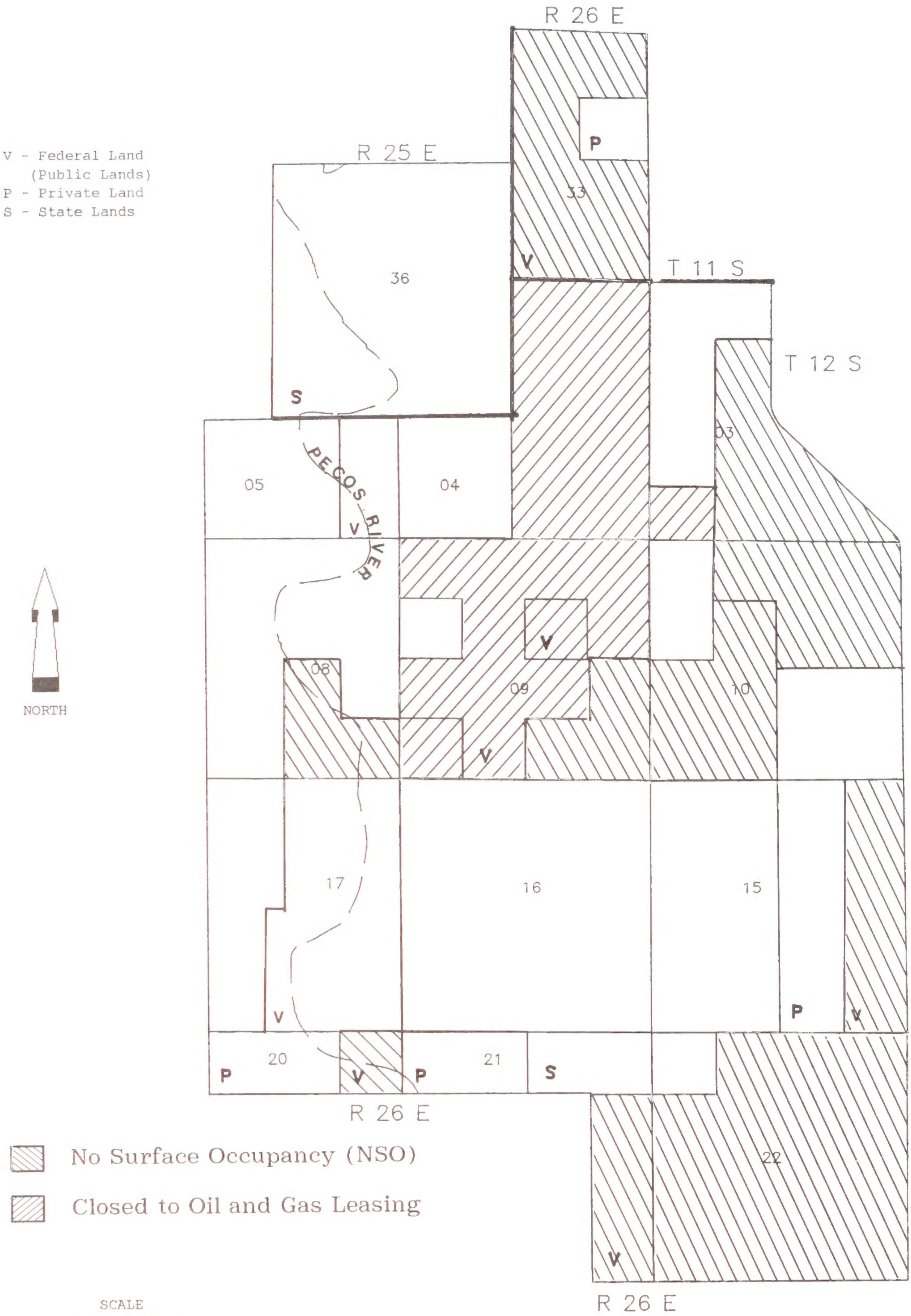
Alternative A



SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-1
OVERFLOW WETLANDS
Roswell Resource Area

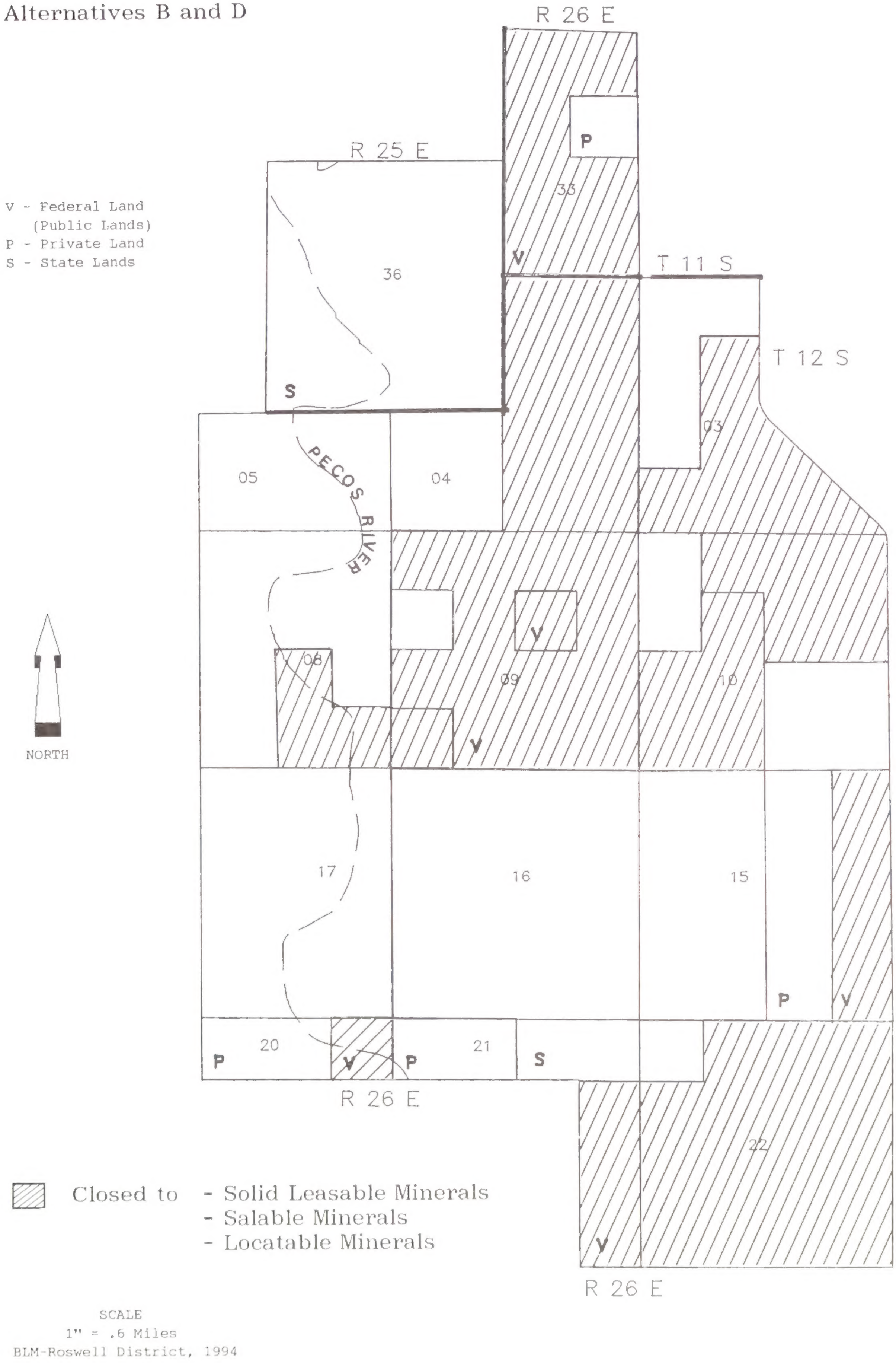
Alternatives B and D



SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-2
OVERFLOW WETLANDS
Roswell Resource Area

Alternatives B and D

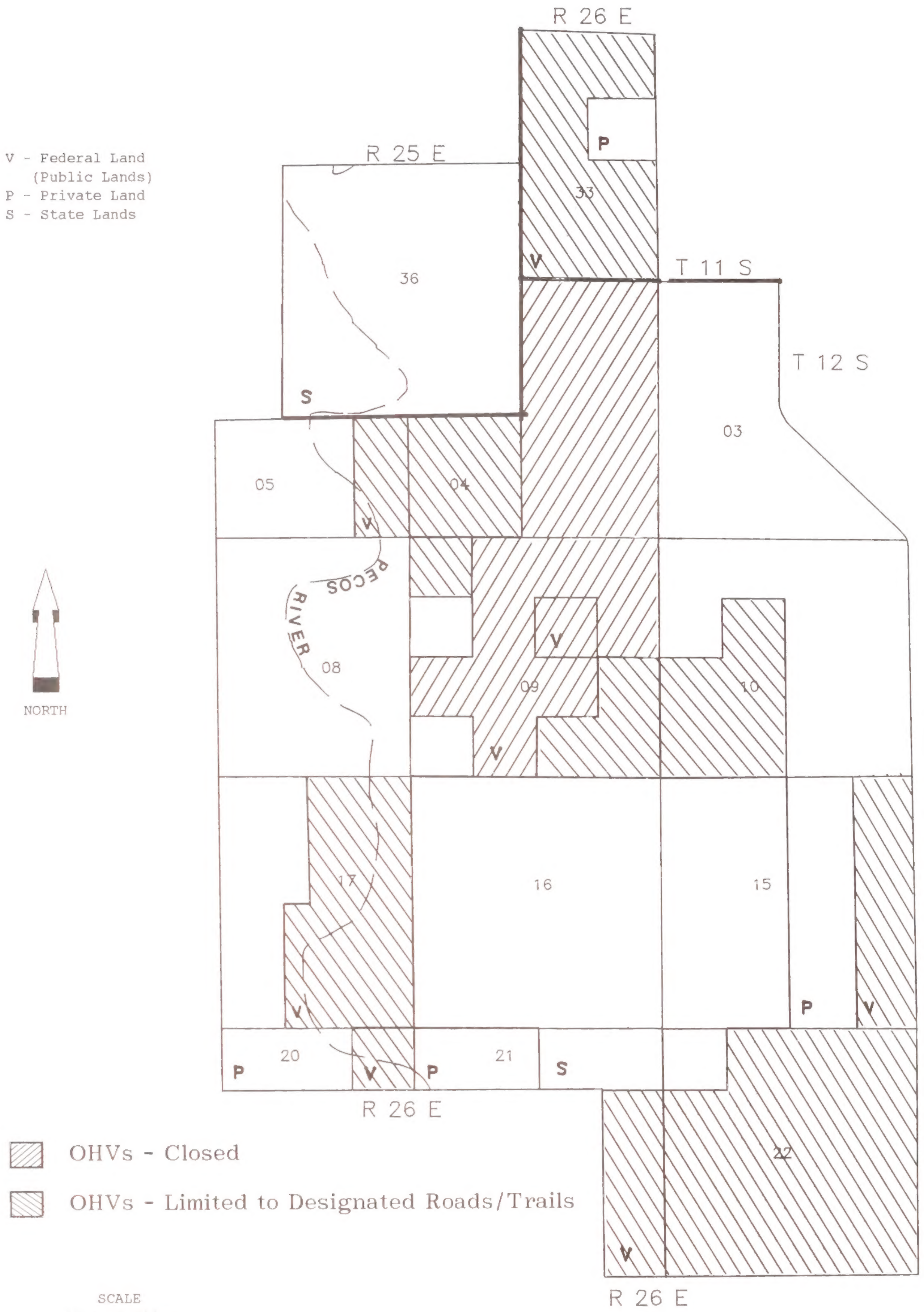


MAP A14-3

OVERFLOW WETLANDS

Roswell Resource Area

Alternatives B and D



V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

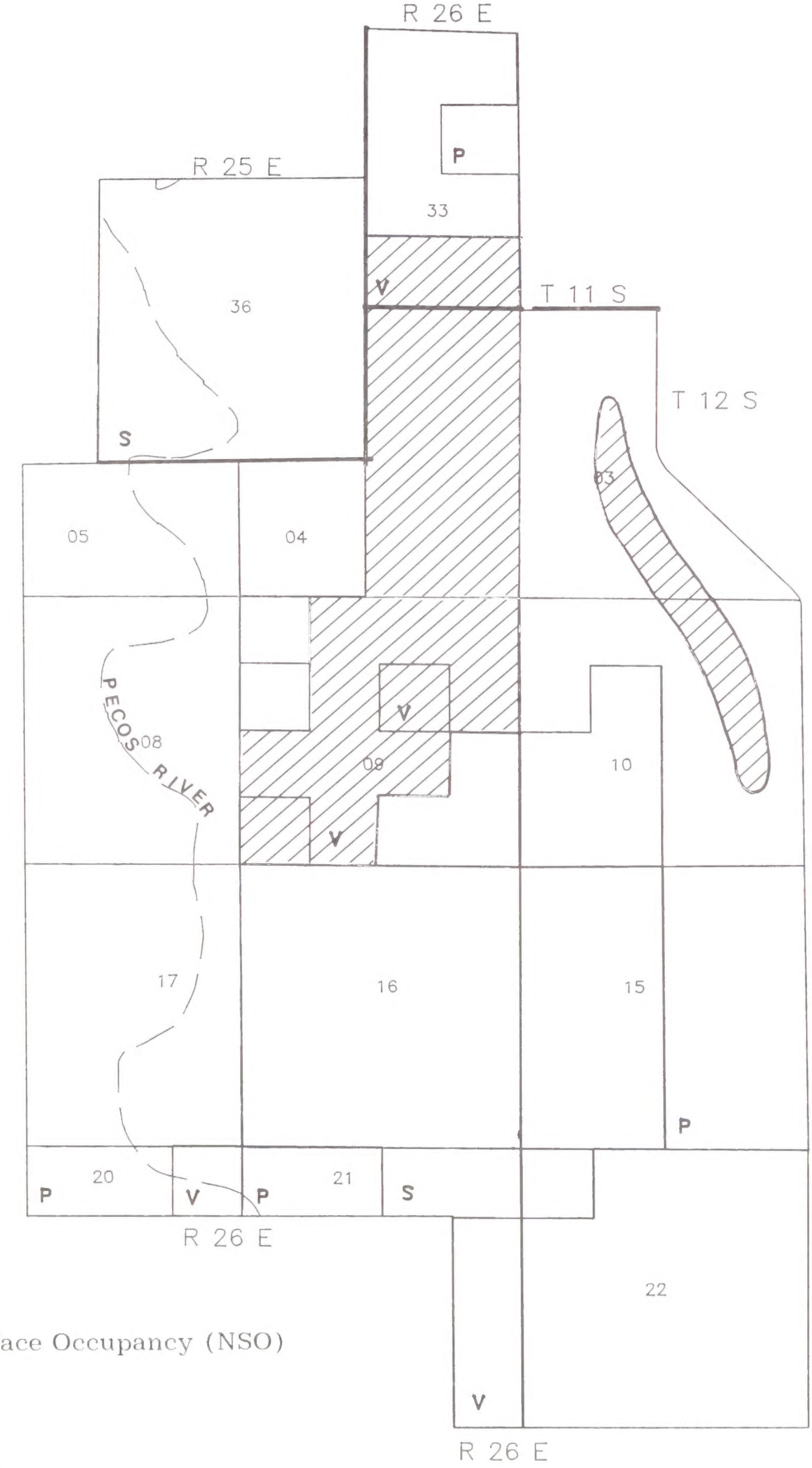
▨ OHVs - Closed

▧ OHVs - Limited to Designated Roads/Trails

SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-4
OVERFLOW WETLANDS
Roswell Resource Area

Alternative C



V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

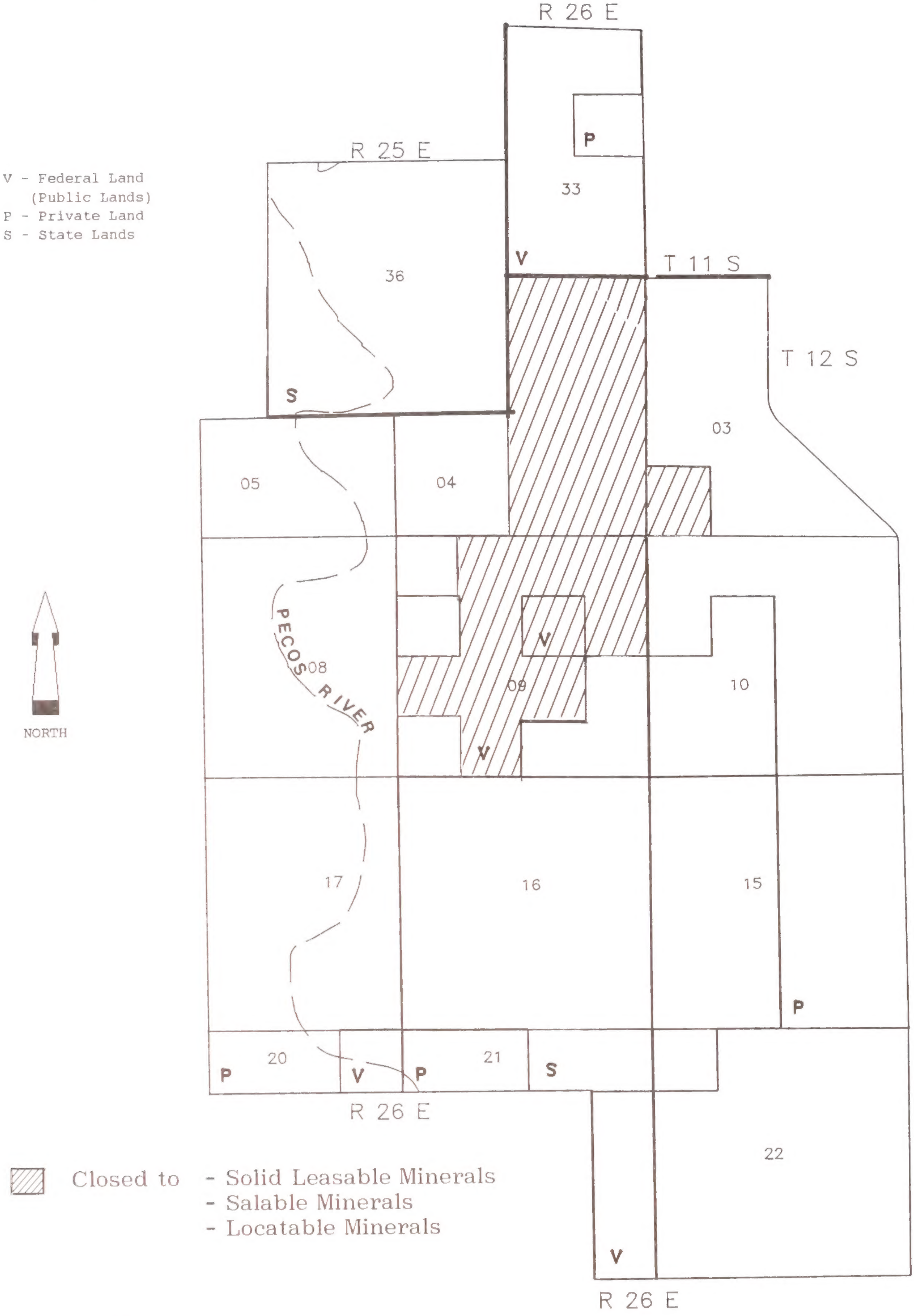
NORTH

▨ No Surface Occupancy (NSO)

SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-5
OVERFLOW WETLANDS
Roswell Resource Area

Alternative C



▨ Closed to

- Solid Leasable Minerals
- Salable Minerals
- Locatable Minerals

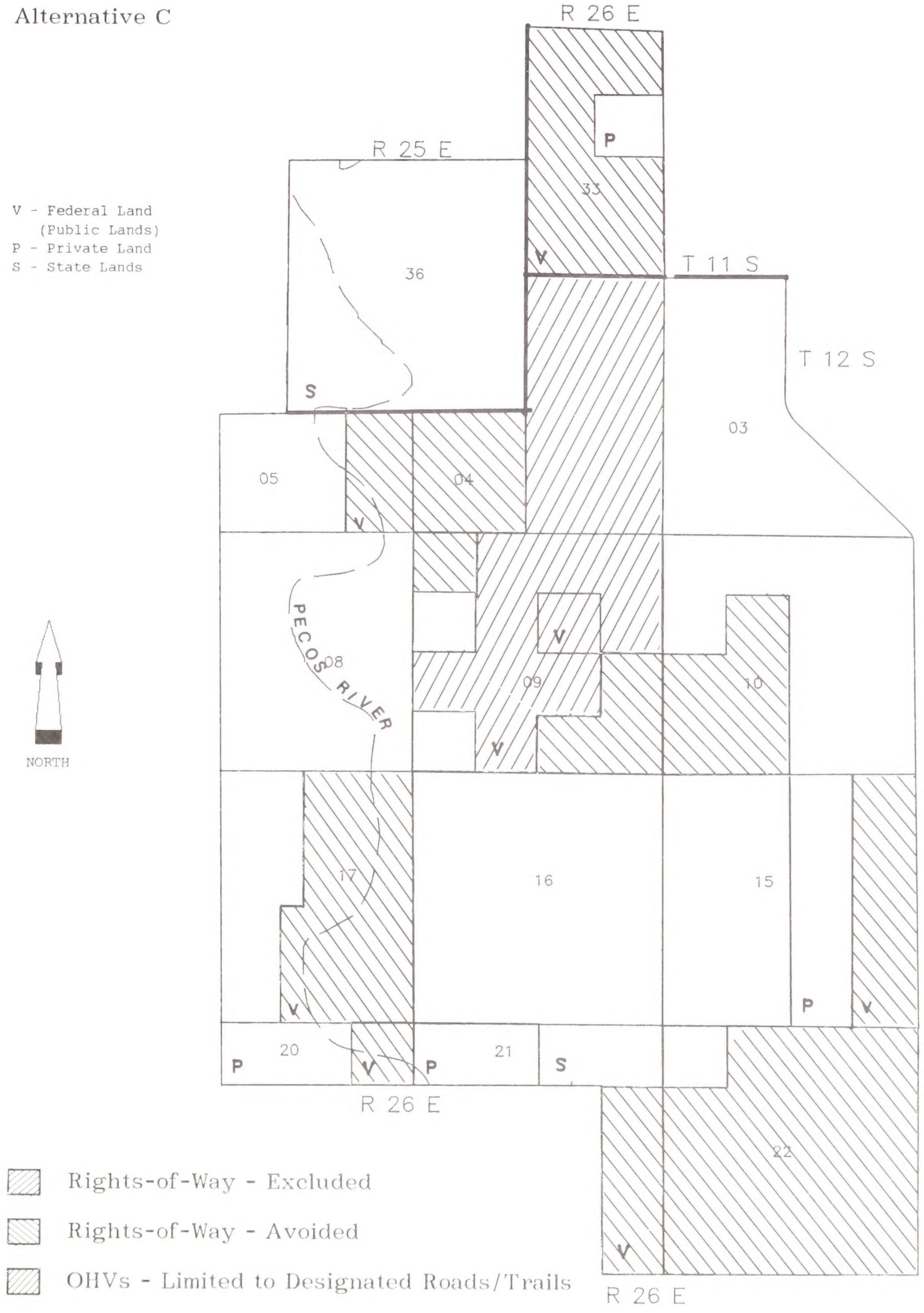
SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-6

OVERFLOW WETLANDS

Roswell Resource Area

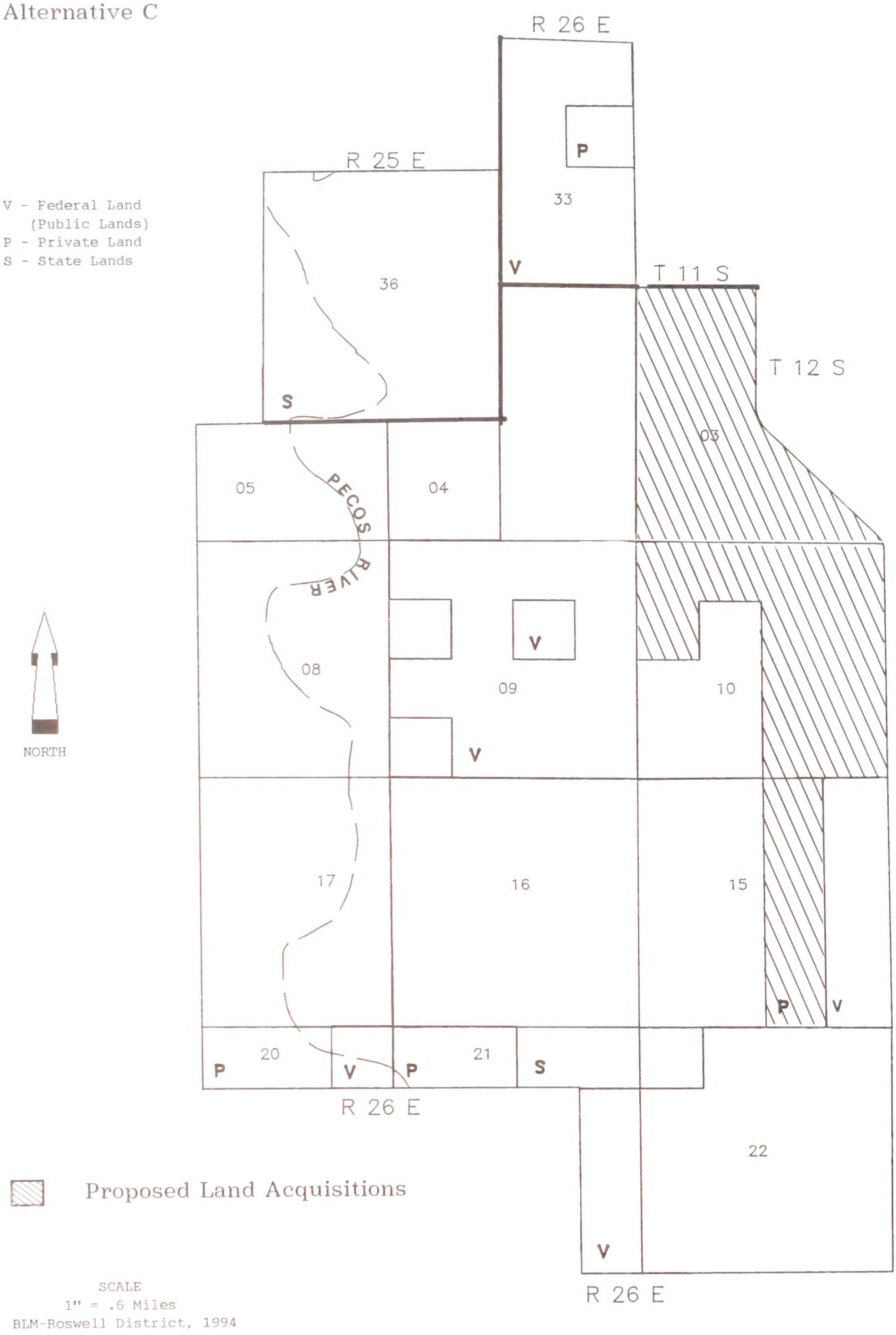
Alternative C



SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-7
OVERFLOW WETLANDS
Roswell Resource Area

Alternative C



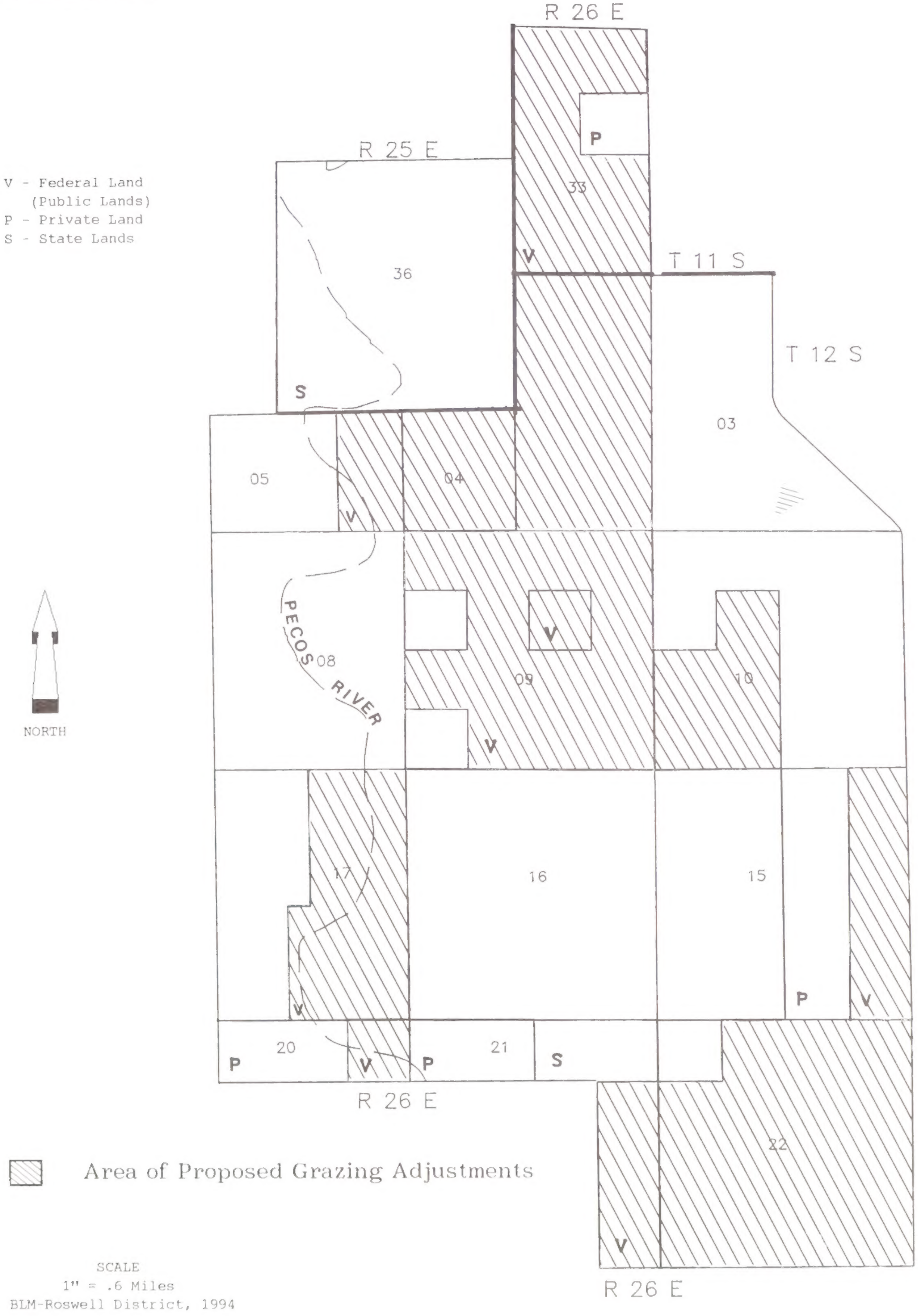
V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

▨ Proposed Land Acquisitions

SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-8
OVERFLOW WETLANDS
Roswell Resource Area

Alternative C

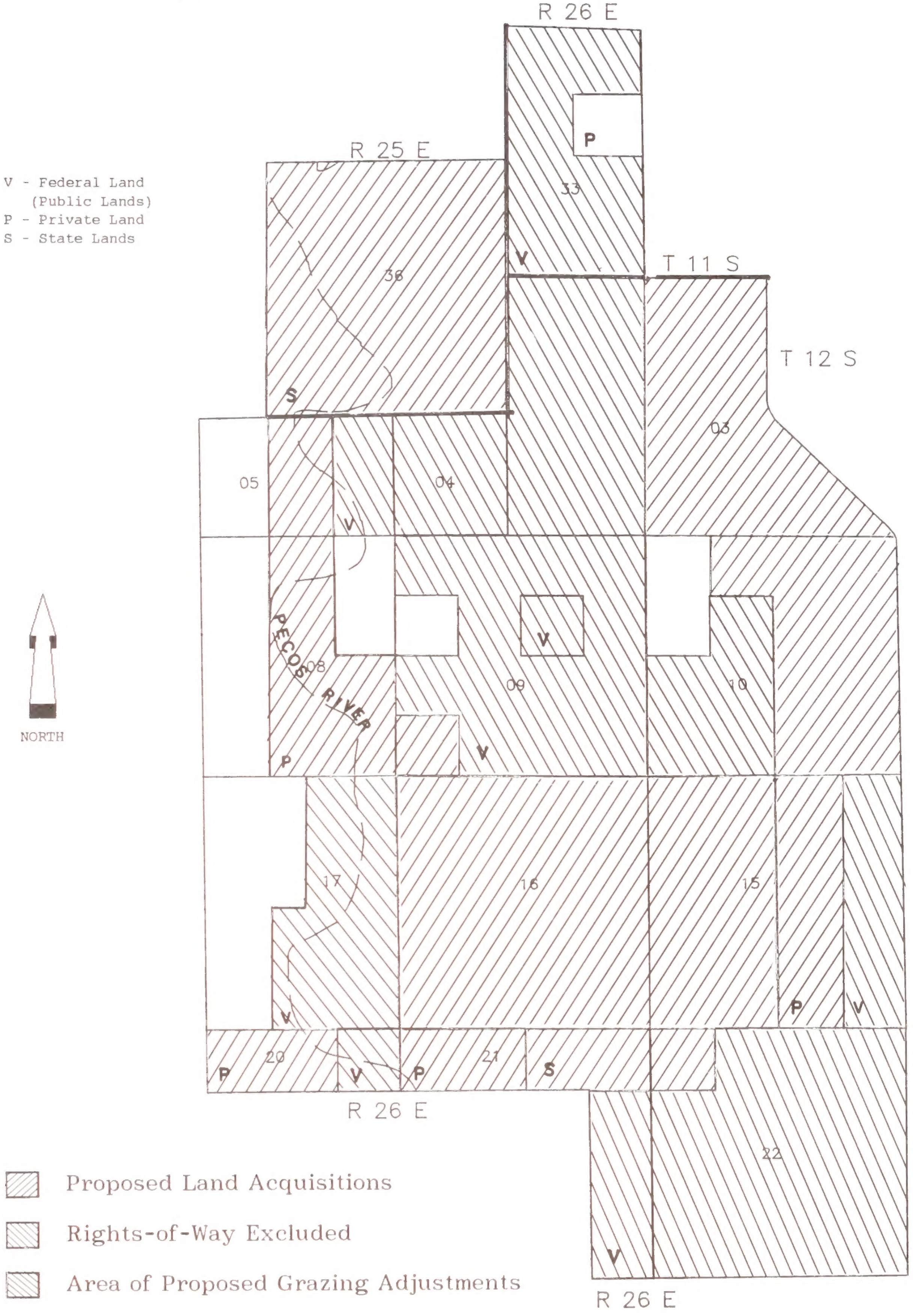


MAP A14-9

OVERFLOW WETLANDS

Roswell Resource Area

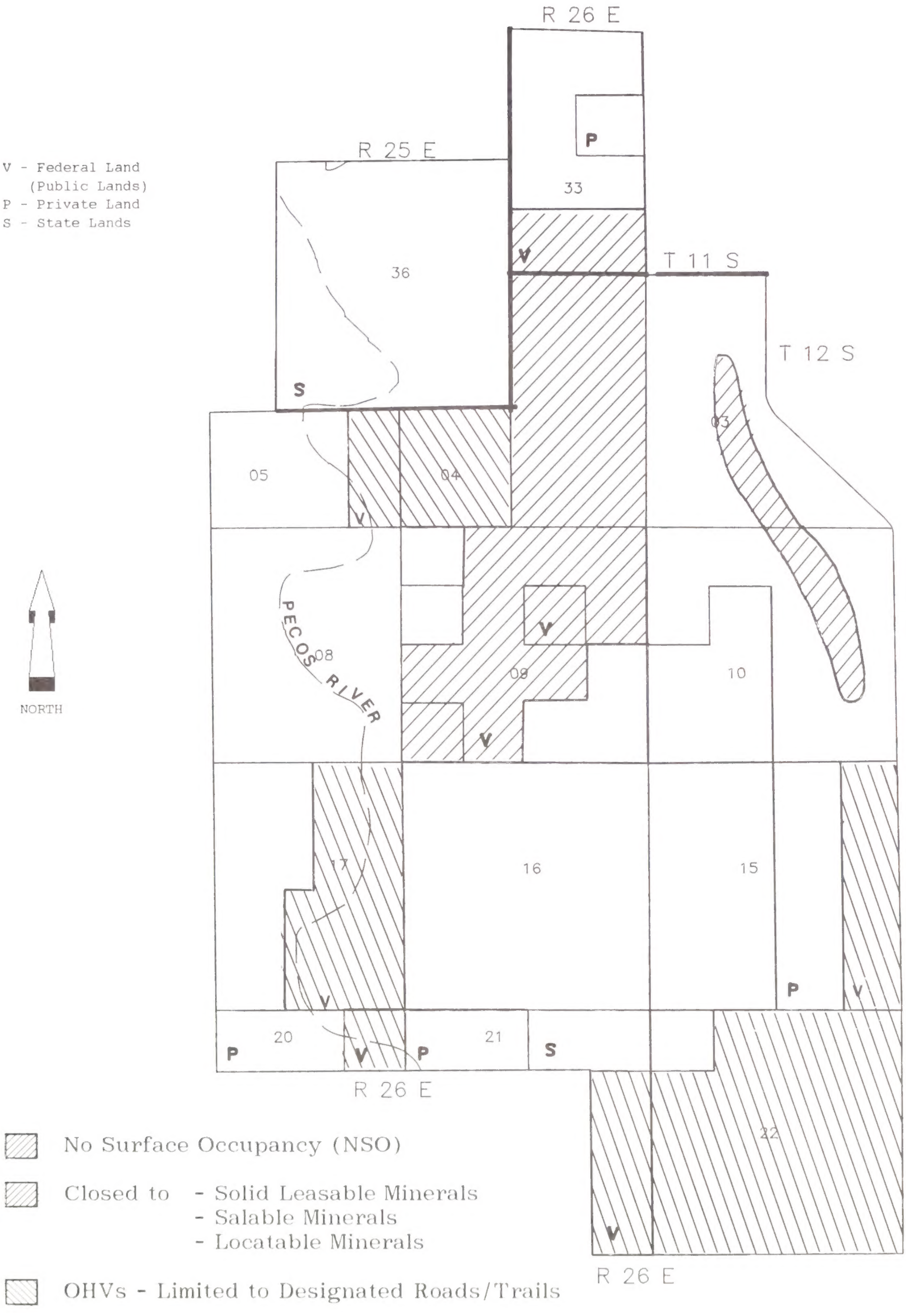
Alternatives B, D and E



SCALE
1" = .6 Miles
BLM-Roswell District, 1994

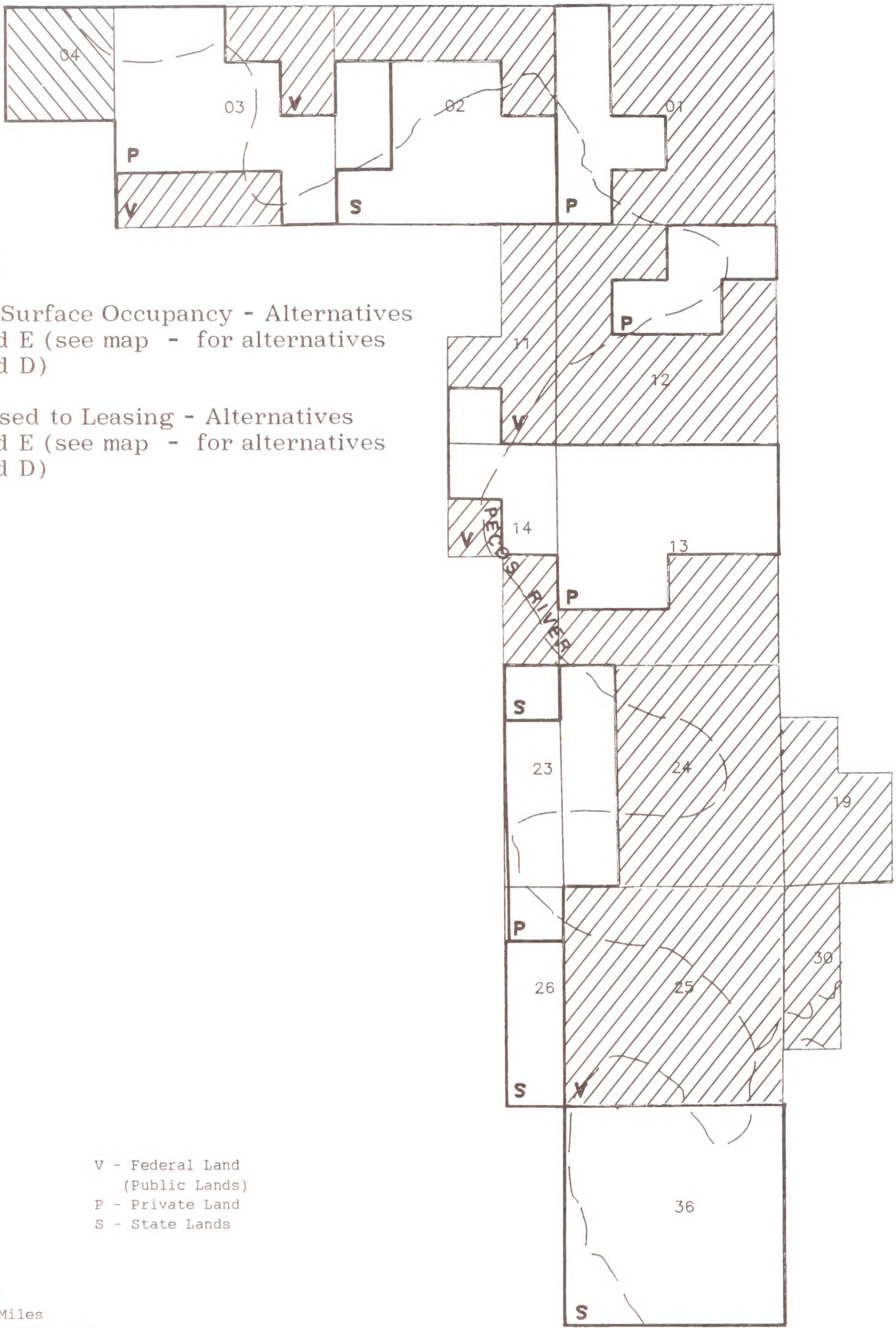
MAP A14-10
OVERFLOW WETLANDS
Roswell Resource Area

Alternative E



SCALE
1" = .6 Miles
BLM-Roswell District, 1994

MAP A14-11
OVERFLOW WETLANDS
Roswell Resource Area



Oil and Gas

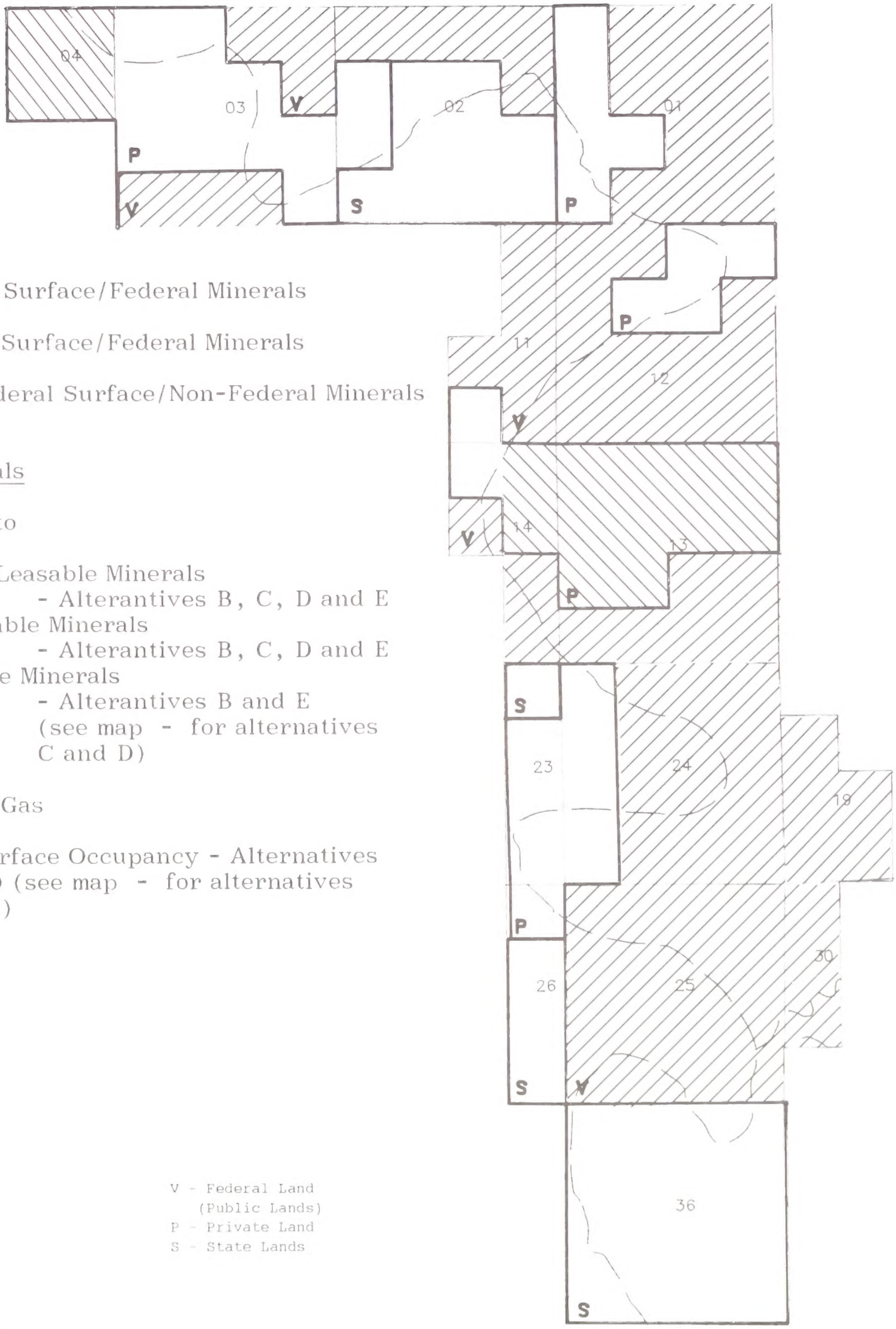
▨ - No Surface Occupancy - Alternatives B and E (see map - for alternatives C and D)

▨ - Closed to Leasing - Alternatives B and E (see map - for alternatives C and D)

V - Federal Land (Public Lands)
P - Private Land
S - State Lands

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-12
NORTH PECOS RIVER
Roswell Resource Area



▨ Federal Surface/Federal Minerals

▨ Private Surface/Federal Minerals

☐ Non-Federal Surface/Non-Federal Minerals

Federal Minerals

Closed to

- Solid Leasable Minerals
  - Alterantives B, C, D and E
- Locatable Minerals
  - Alterantives B, C, D and E
- Salable Minerals
  - Alterantives B and E (see map - for alternatives C and D)

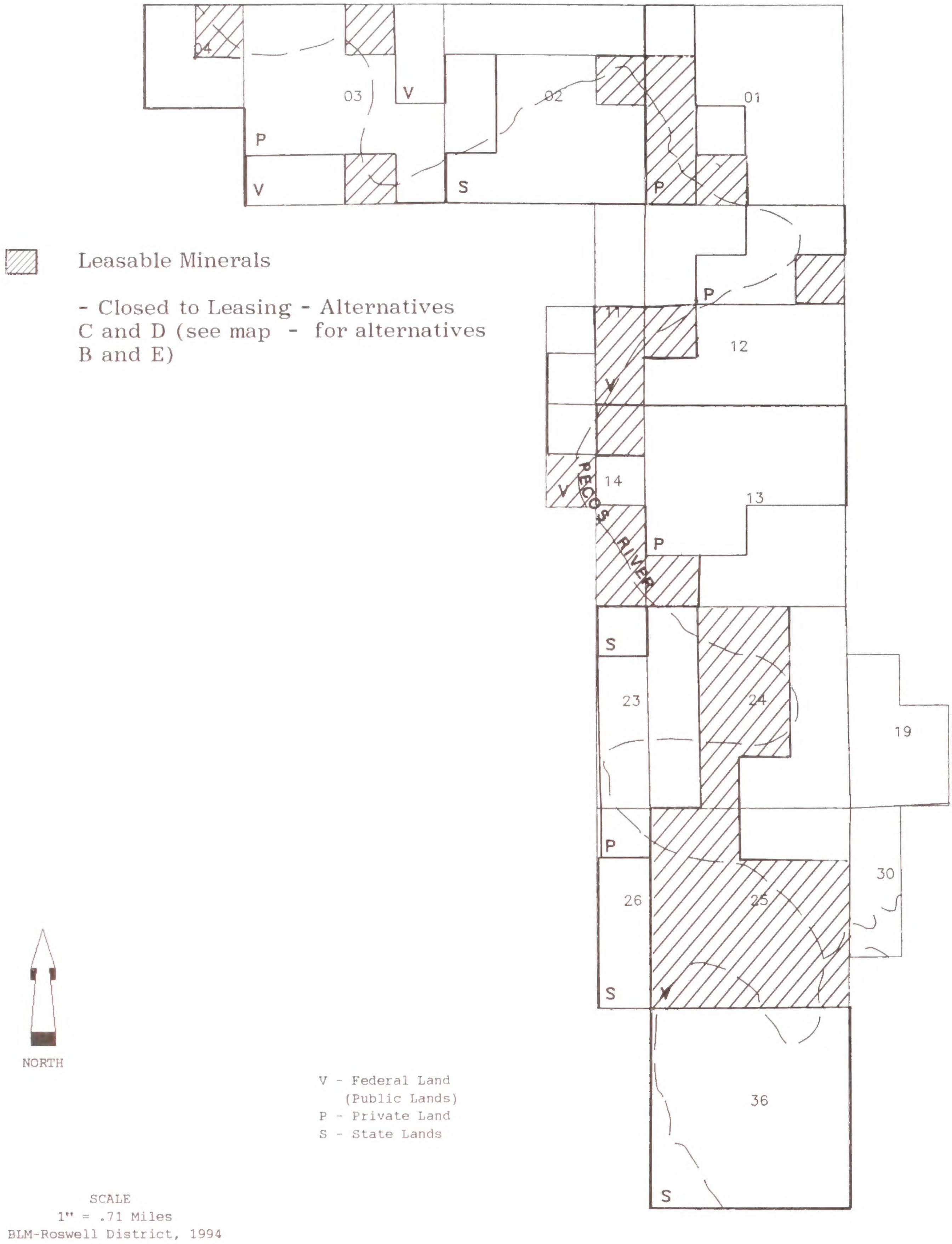
Oil and Gas

- No Surface Occupancy - Alternatives C and D (see map - for alternatives B and E)

V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-13
NORTH PECOS RIVER
Roswell Resource Area



▨ Leasable Minerals

- Closed to Leasing - Alternatives C and D (see map - for alternatives B and E)

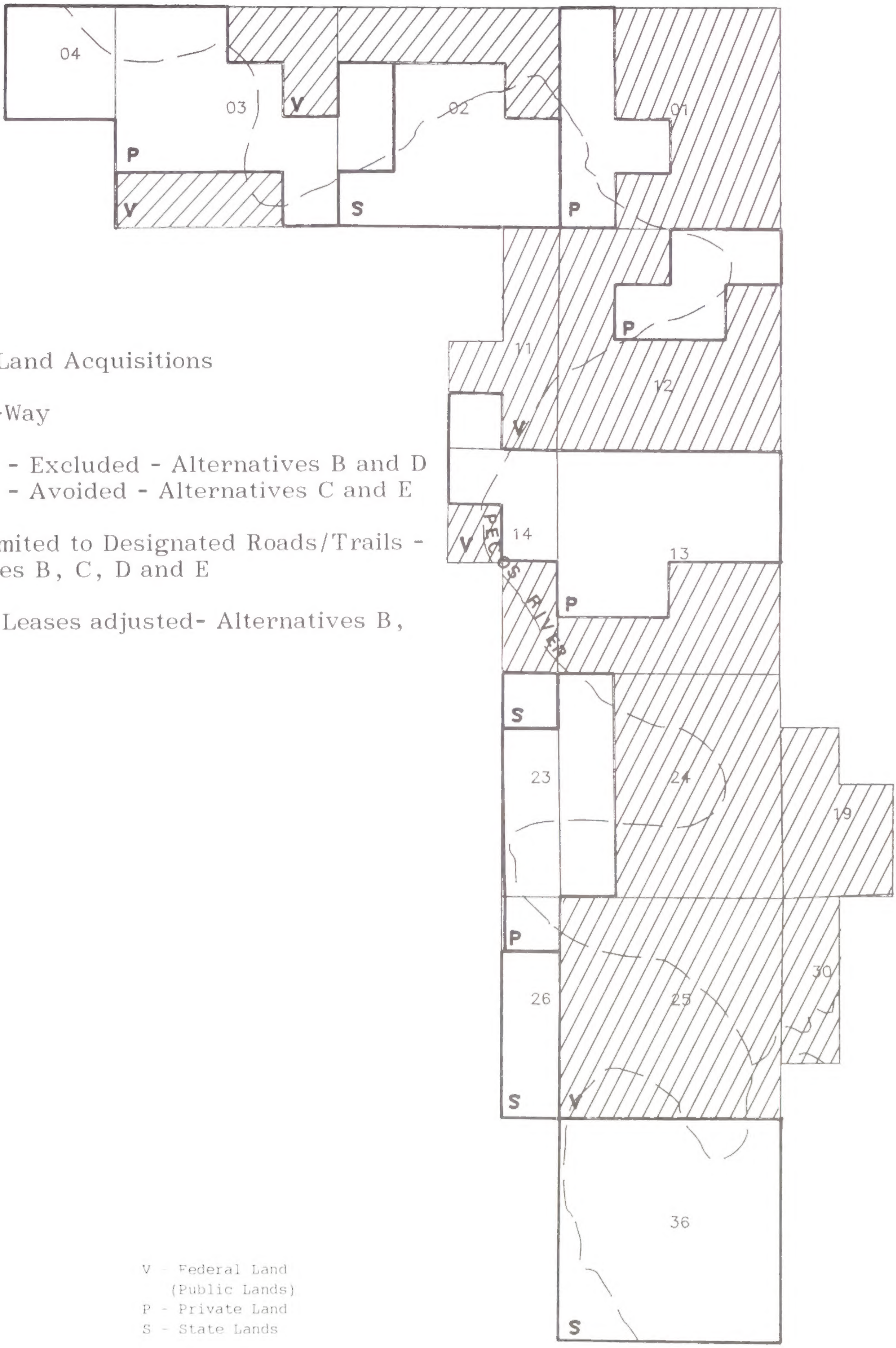
V - Federal Land (Public Lands)
P - Private Land
S - State Lands

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-14

NORTH PECOS RIVER

Roswell Resource Area



☐ Proposed Land Acquisitions

▨ Rights-of-Way

- Excluded - Alternatives B and D
- Avoided - Alternatives C and E

▨ OHVs - Limited to Designated Roads/Trails - Alternatives B, C, D and E

▨ Grazing - Leases adjusted- Alternatives B, D and E

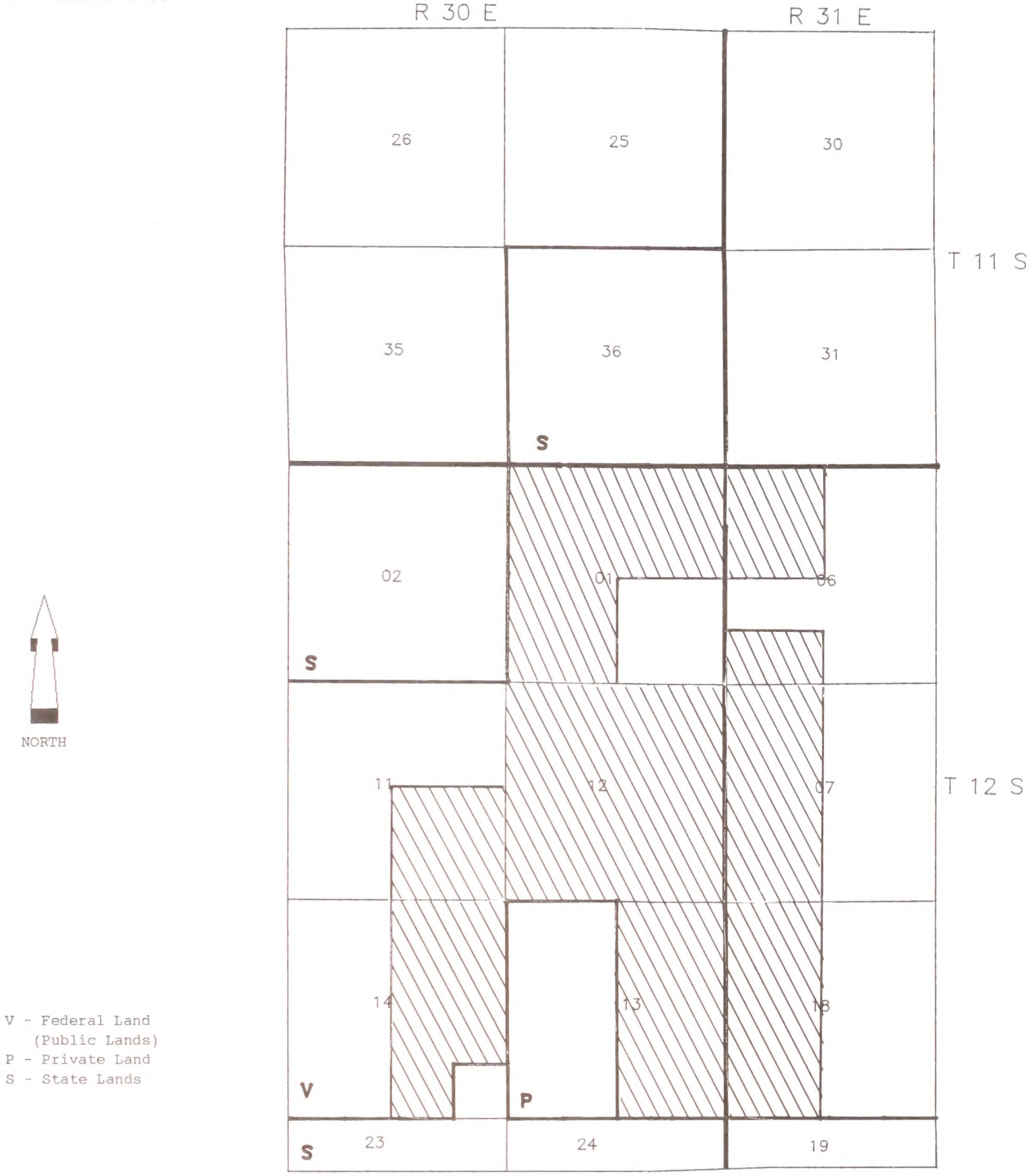
NORTH

V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-15
NORTH PECOS RIVER
Roswell Resource Area

Alternative A

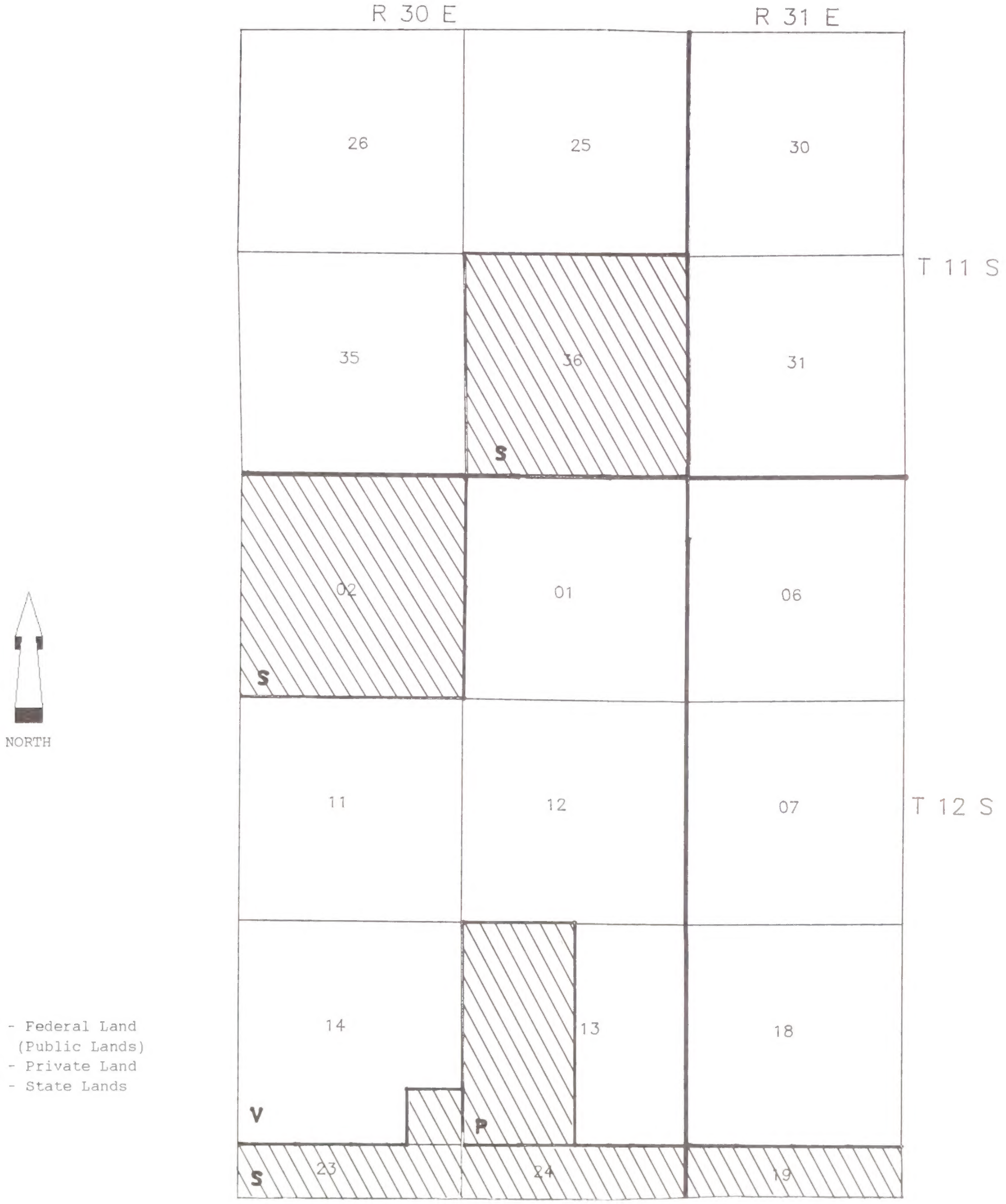


▨ No Surface Occupancy

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-16
MESCALERO SANDS
Roswell Resource Area

Alternative A



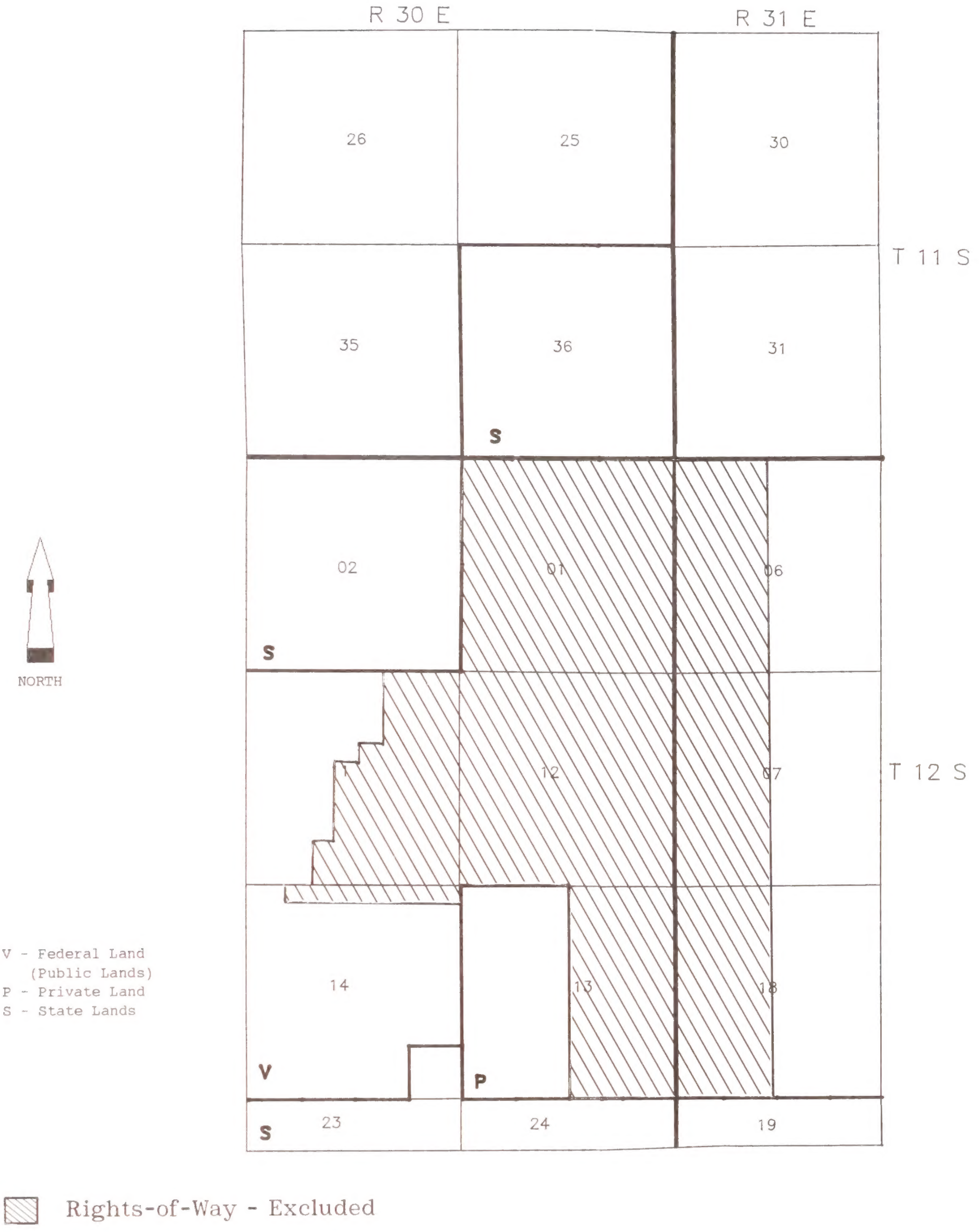
V - Federal Land (Public Lands)
P - Private Land
S - State Lands

☐ Closed to Locatable Minerals

▨ Other Mineral Ownership

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

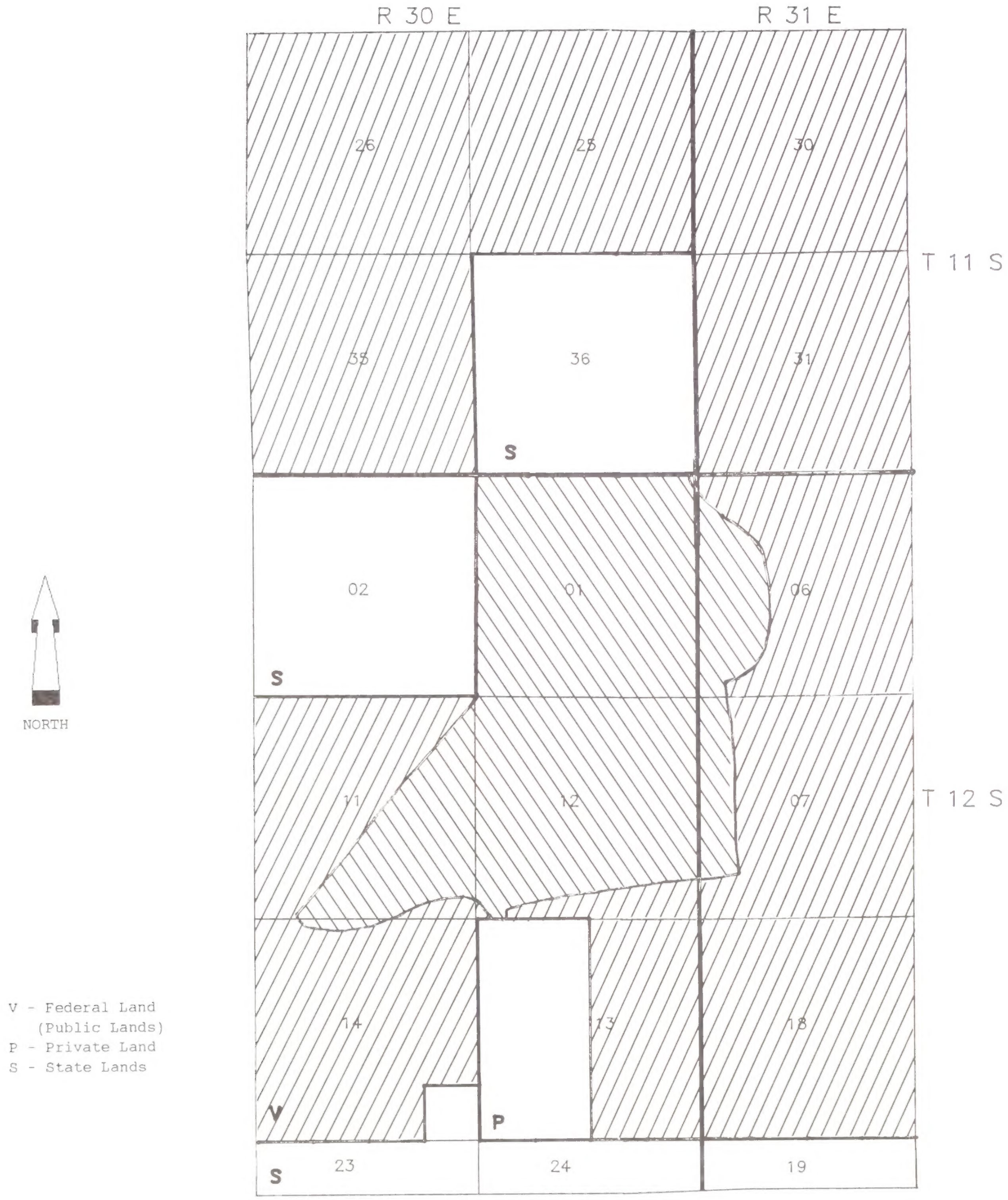
MAP A14-17
MESCALERO SANDS
Roswell Resource Area



SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-18
MESCALERO SANDS
Roswell Resource Area

Alternative A



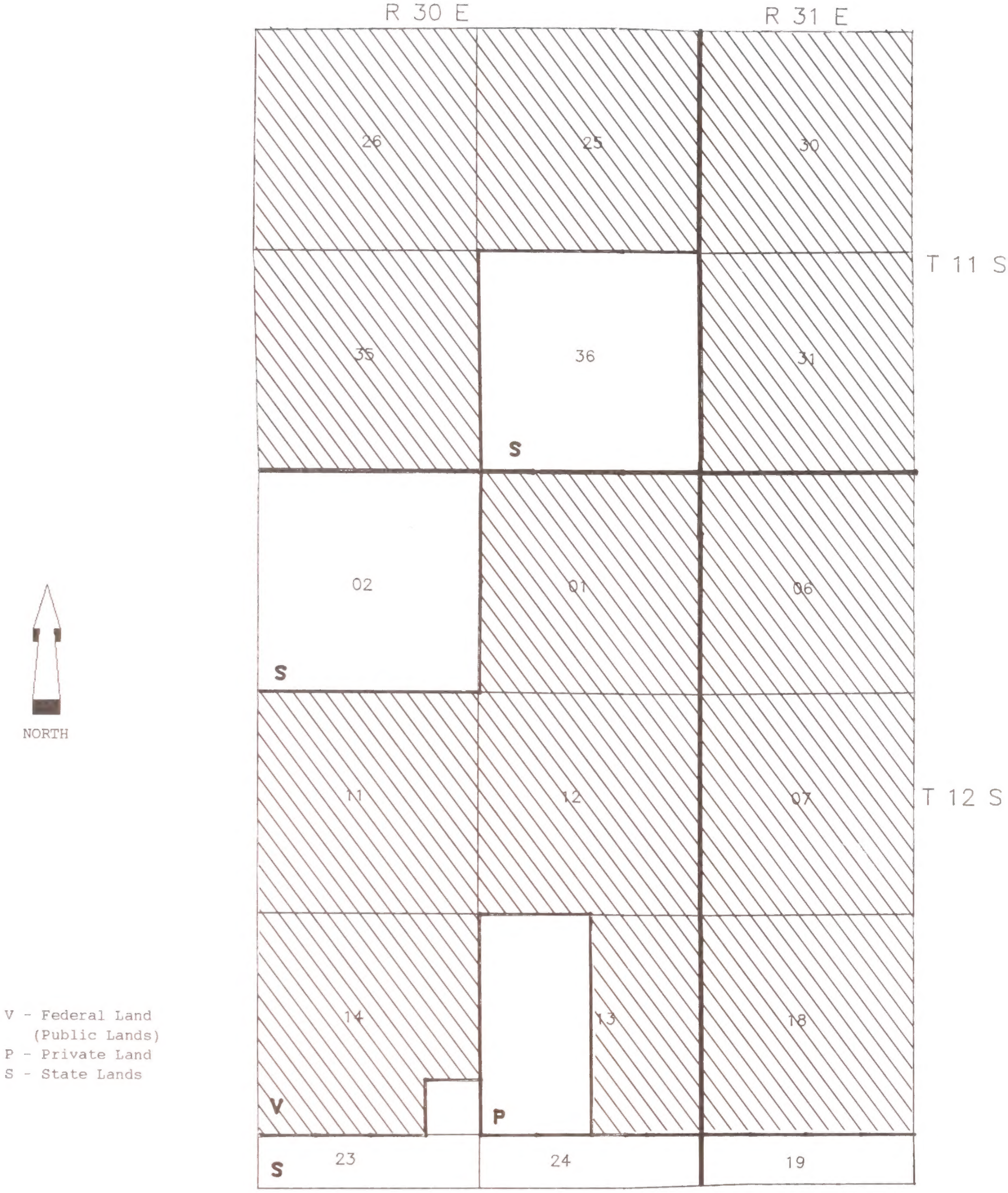
▨ OHVs - Closed
Grazing - Excluded

▨ OHVs - Limited to Designated
Roads/Trails

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-19
MESCALERO SANDS
Roswell Resource Area

Alternative B



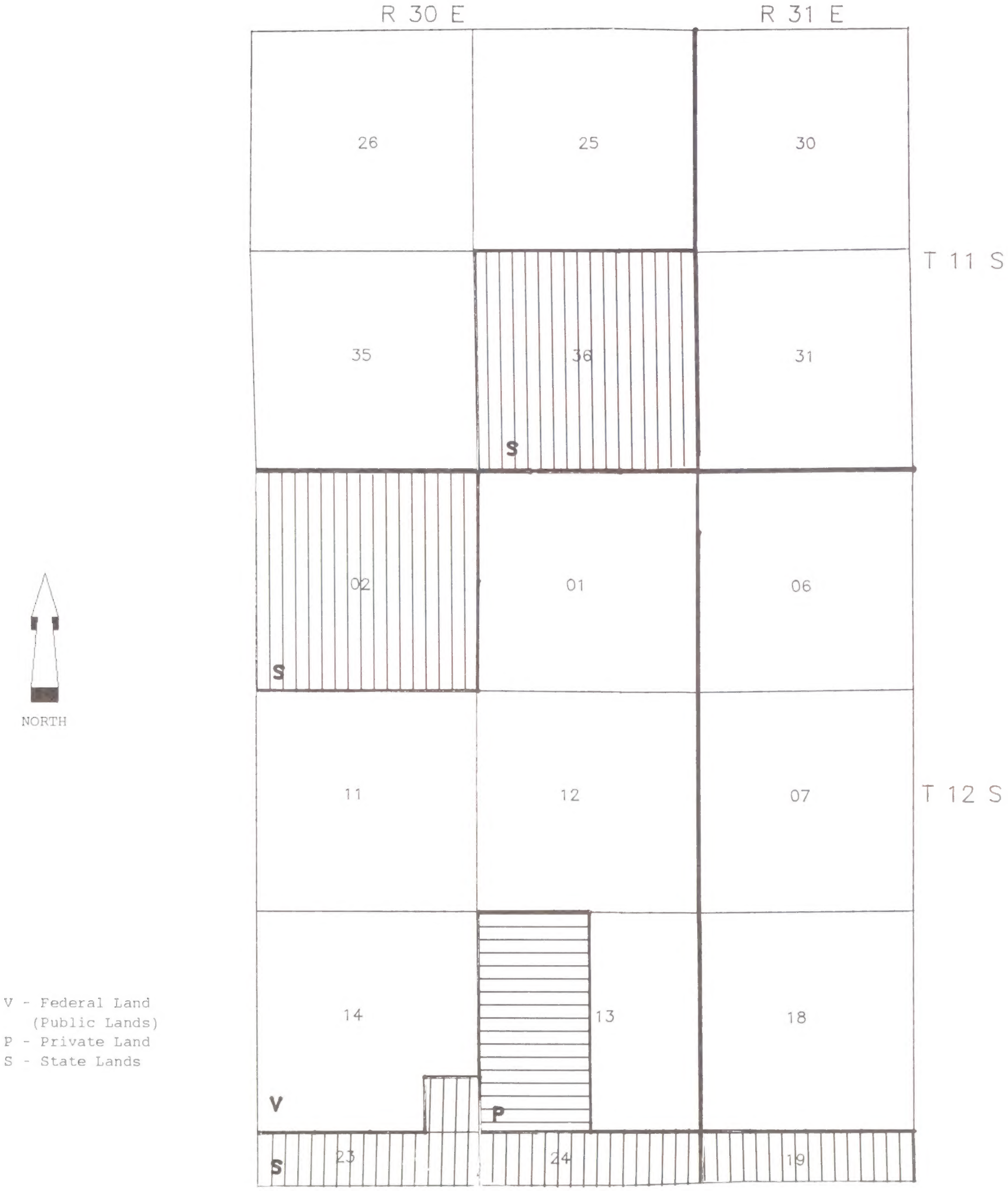
▨ Closed to
- Solid Leasable Minerals
- Salable Minerals
- Locatable Minerals
- Oil and Gas Leasing
- OHVs

▨ Excluded
- Rights-of-Way
- Grazing

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-20
MESCALERO SANDS
Roswell Resource Area

Alternative B



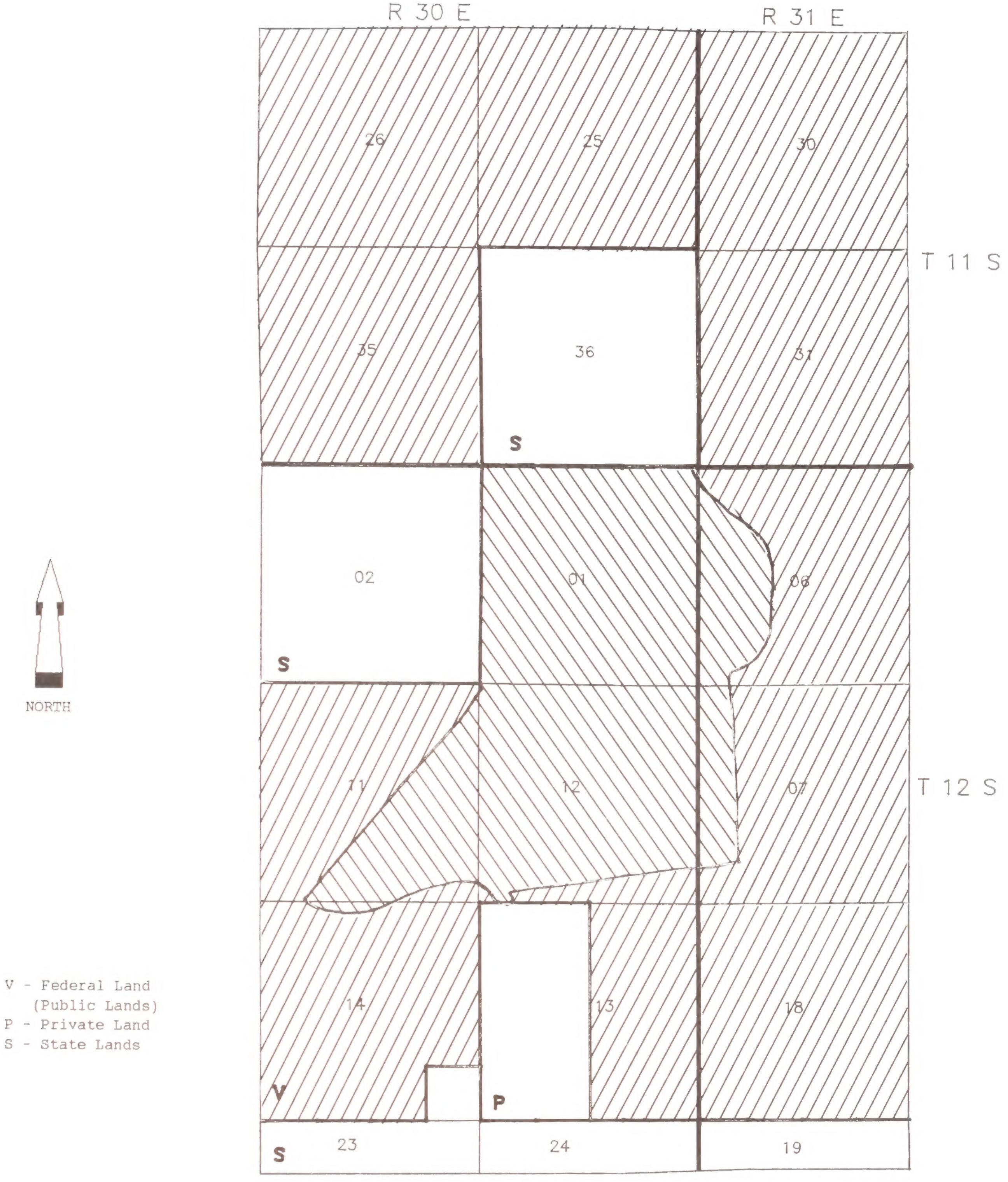
▥ Proposed Acquisition - State Land

▤ Proposed Acqusition - Private Land

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-21
MESCALERO SANDS
Roswell Resource Area

Alternative C



V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

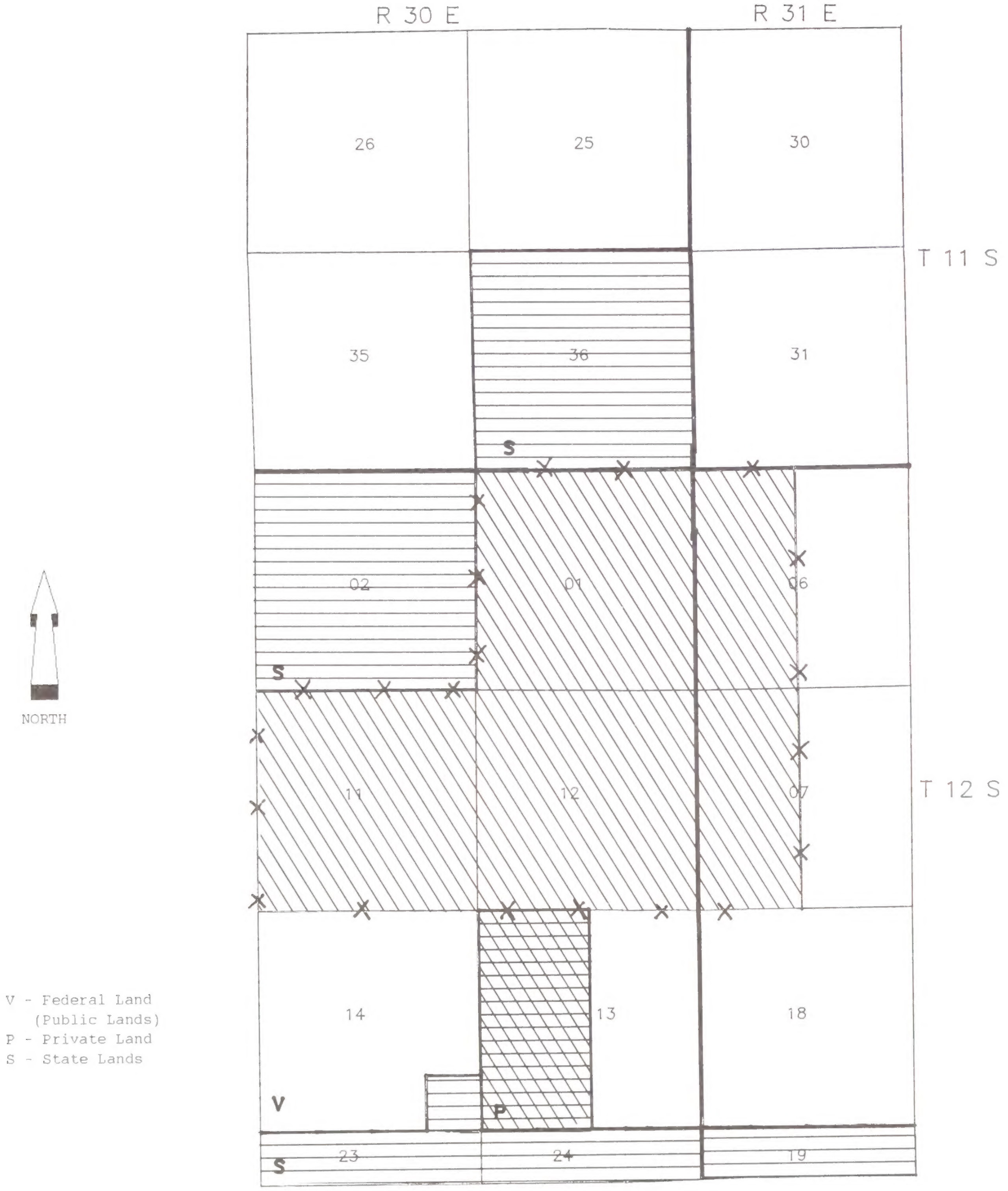
▧ OHVs - Closed
Grazing - Excluded

▨ OHVs - Limited to Designated Roads/Trails
Rights-of-Way - Avoided
No Surface Occupancy (NSO)

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-22
MESCALERO SANDS
Roswell Resource Area

Alternative D



ENTIRE AREA

OHVs - Limited to Designated Roads/Trails
Rights-of-Way - Excluded
No Surface Occupancy (NSO)

▨ Grazing - Excluded

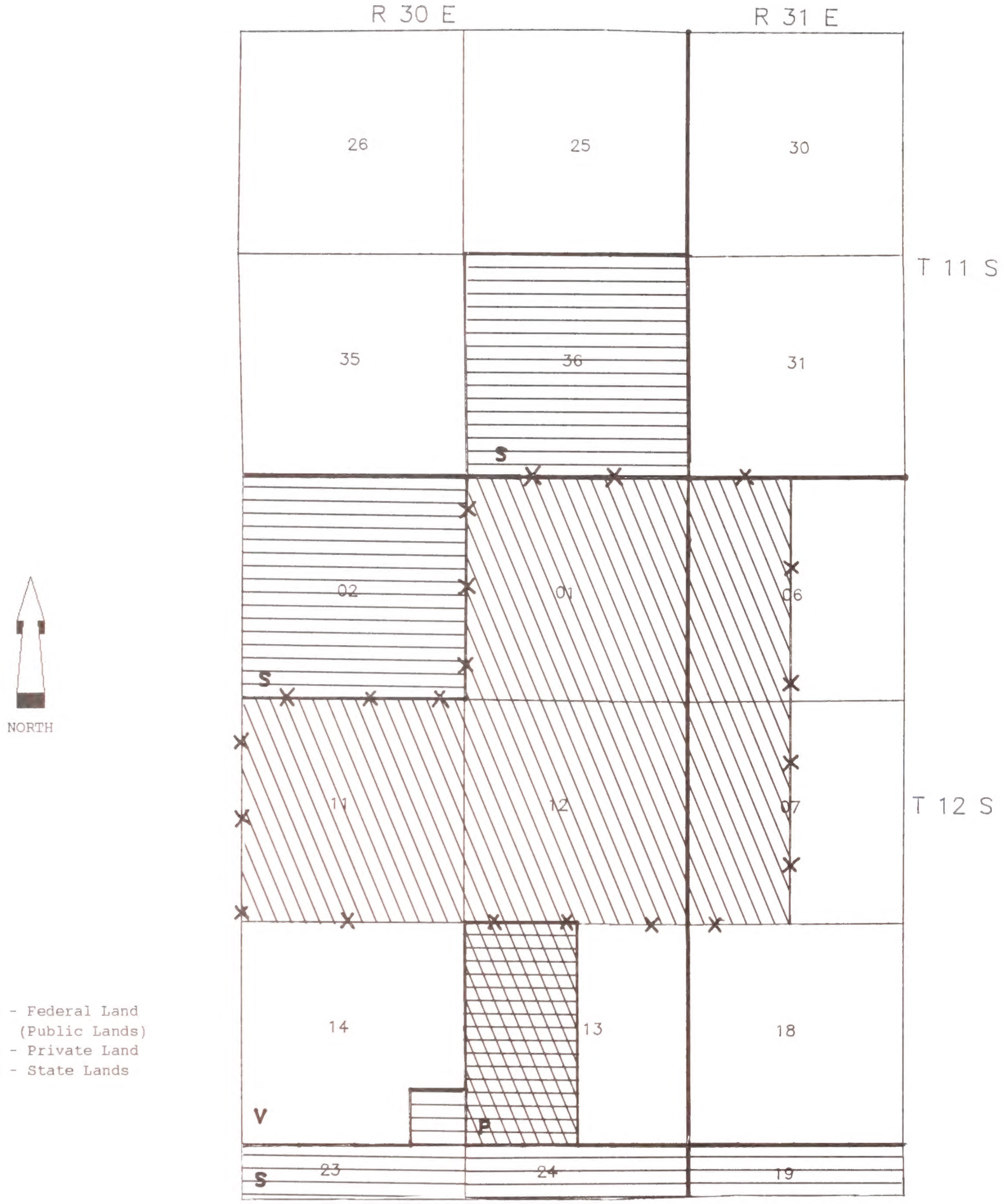
▩ Proposed Acquisition - State Land

▤ Proposed Acquisition - Private Land

SCALE
1" = .71 Miles
BLM-Roswell District, 1994

MAP A14-23
MESCALERO SANDS
Roswell Resource Area

Alternative E



V - Federal Land
(Public Lands)
P - Private Land
S - State Lands

ENTIRE AREA

Rights-of-Way - Excluded
Closed to - Leasable Minerals
- Salable Minerals
- Locatable Minerals
- Oil and Gas Leasing

▤ Proposed Acquisition - State Land

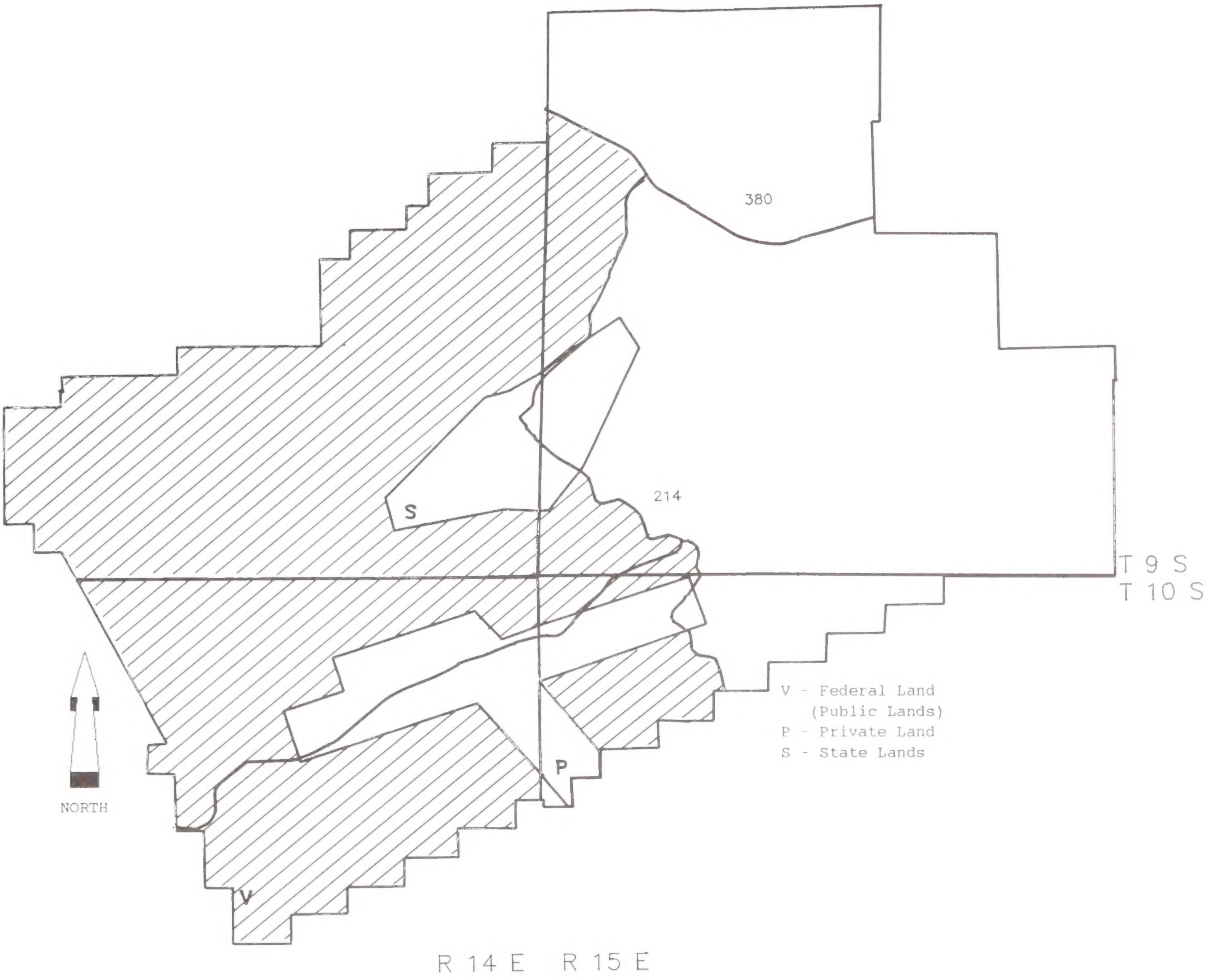
▩ Proposed Acquisition - Private Land

▧ Grazing - Excluded
OHVs - Closed

SCALE
1" = .71 Miles

BLM-Roswell District, 1994

MAP A14-24
MESCALERO SANDS
Roswell Resource Area



Entire Fort Stanton (Public Lands), Alternative A

Closed to - Solid Leasable Minerals
- Salable Minerals
- Locatable Minerals
- Oil and Gas Leasing

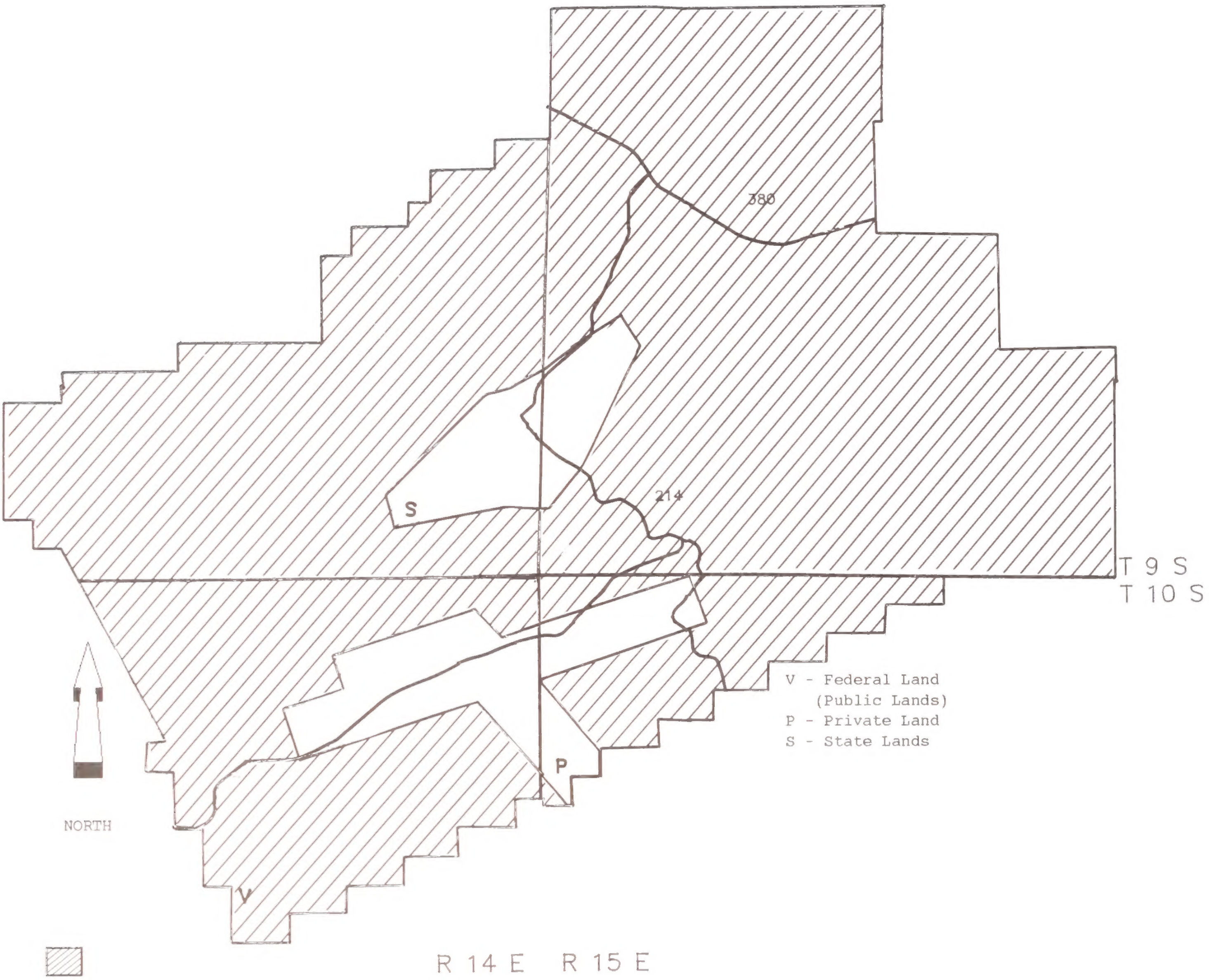
Grazing - Allowed nine months per year

▨ OHVs - Limited to Designated Roads/Trails

☐ OHVs - Open on remainder of Public Lands

SCALE
1" = 1.42 Miles
BLM-Roswell District, 1994

MAP A14-25
FORT STANTON
Roswell Resource Area



▨ Entire Fort Stanton (Public Lands)

Closed to
- Solid Leasable Minerals - Alternatives B, C, D and E
- Locatable Minerals - Alternatives B, C, D and E
- Oil and Gas Leasing - Alternatives B, C, D and E
- Salable Minerals (1 - Five acre pit allowed) - Alternative B

Open to
- Salable Minerals - Alternatives C, D and E

Grazing
- Allowed - Alternatives C, D and E

OHVs - Limited to Designated Roads/Trails - Alternatives B, C, D and E

Rights-of-Way
- Excluded - Alternatives B, D and E
- Avoided - Alternative C

SCALE
1" = 1.42 Miles
BLM-Roswell District, 1994

MAP A14-26
FORT STANTON
Roswell Resource Area

APPENDIX 15
OIL AND GAS OPERATIONS

This appendix describes, in general terms, oil and gas exploration (geophysical), drilling and production operations.

GEOPHYSICAL EXPLORATION

Oil and gas can be discovered by either direct or indirect exploration methods. Examples of direct methods are the mapping of rock outcrops and seeps, and reviewing borehole and remote sensing data. In many cases indirect methods, such as seismic, gravity, and magnetic surveys are required to delineate subsurface features which may contain oil and gas.

Seismic Reflection Surveys

Seismic prospecting is the best and most popular indirect method currently used in the Roswell District for locating subsurface structures which may contain oil and gas. Seismic energy (shock waves) is induced into the earth using one of several methods. As these waves travel downward and outward they encounter various rock strata, each having a different seismic velocity. As the wave energy encounters the interface between rock layers where the lower layer is of lower velocity some of the seismic energy is reflected upward. Sensing devices commonly called geophones are placed on the surface to detect these reflections. The geophones are connected to a data recording truck which stores data on magnetic tape. The time required for the shock waves to travel from the source down to a given reflector and back to the geophone can be related to depth.

There are many methods available today which an explorer can use to induce the initial seismic energy into the earth. All methods require preliminary surveying and laying of geophones. Generally, a single source line of some miles is surveyed, along which the energy sources eventually travel or are aligned. Strings of geophones (receiver lines) are arrayed perpendicular to the source line at intervals determined when the project is designed. Most commonly used in the Roswell District are the thumper and vibrator methods, which pound or vibrate the earth to create a shock wave. Usually four large trucks are used, each equipped with a vibrator pad, about four-foot square. The pads are lowered to the ground and vibrators on all trucks are triggered electronically from the recording truck. Information is recorded and then the trucks move forward a short distance and the process is repeated. Less than 50 square feet of surface area is required to operate the equipment at each test site.

A relatively recent development in seismic exploration is a technique called the 3-D process. This technique uses essentially the same process as that employed in the vibrator method. However, in a 3-D project, as many as 6 to 12 or more source (vibrator) lines may be arranged in a parallel array with a separation of several hundred to a thousand feet or more between the lines. Geophone (receiver) lines are laid out in a similar pattern perpendicular to the source lines. This technique is often used in the Roswell District in existing oil or gas fields to improve the chances of drilling producing in-field wells.

Geophysical exploration methods that are seldom employed in southeastern New Mexico are the drilling method, commonly called "shot-hole" method, the gravity survey method and the geomagnetic survey method. The shot-hole process uses truck-mounted drills which drill small-diameter holes to depths of up to 200 feet. Four to twelve holes are drilled per mile of line. Usually, a 50-pound charge of explosives is placed in the hole, covered, and detonated. The detonated explosive sends energy waves below the earth's surface which are reflected to the surface from various subsurface rock layers.

Gravitational prospecting detects micro-variations in gravitational attraction caused by the differences in the density of various types of rock. Gravity data is used to generate anomaly maps from which faults and general structural trends can be interpreted. These surveys are generally not considered definitive due to the many data corrections required (e.g., terrain, elevation, latitude, etc.) and the poor resolution of complex subsurface structures.

Magnetic prospecting is most commonly used for locating metallic ore bodies but is used to a limited extent in oil and gas exploration. Magnetic surveys use an instrument called a magnetometer to detect small magnetic anomalies caused by mineral and lithologic variations in the earth's crust. These surveys can detect large trends in basement rock and the approximate depth to those basement rocks, but in general they provide little specific data to aid in petroleum exploration.

Each of the foregoing methods have inherent strengths and weaknesses and explorers must decide which method is the most practical with regard to surface constraints (such as topography) but will still produce information which can be useful for the particular study. Extensive computer processing of the raw data is required to produce a useable seismic section from which geophysicists may interpret structural relationships to depths of 30,000 feet or more. The effective depth of investigation and resolution are determined to some degree by which method is used.

Geophysical Management - Permitting Process

Over the 7-year period from 1986 through 1992, both resource areas in the Roswell District processed seismic exploration notices of intent on public lands (see Table A15-1).

TABLE A15-1
SEISMIC EXPLORATION NOTICES ON PUBLIC LANDS

Year	Number of Notices Approved Carlsbad RA	Roswell RA
1986	44	8
1987	29	8
1988	49	12
1989	82	26
1990	97	15
1991	49	6
1992	24	2
Total	369	77

The responsibilities of the geophysical operator and the Area Manager during geophysical operations are as follows (USDI 1992):

1. Geophysical Operator - An operator is required to file with the Area Manager a "Notice of Intent to Conduct Oil and Gas Exploration Operations." The "Notice of Intent" includes a map showing the location of the line or lines, all access routes, and ancillary facilities. The party filing the "Notice of Intent" must be bonded. A copy of the bond or other evidence of satisfactory bonding accompanies the Notice.

   Since all geophysical operations are interpreted as resulting in some degree of surface disturbance, a cultural resource survey and a threatened and endangered species clearance are required. The operator is required to comply with all applicable federal, state, and local laws. A pre-work field conference may be conducted. Earth-moving equipment must not be used without prior written approval. Upon completion of operations, including any required reclamation, the operator is required to file a "Notice of Completion of Oil and Gas Exploration Operations."

2. Area Manager - The Area Manager contacts the operator after the "Notice of Intent" is filed and apprise the operator of the practices and procedures to be followed prior to commencing operations on BLM-administered lands.

   The Area Manager completes a final inspection and notifies the operator if the terms and conditions of the "Notice of Intent" have been met or that additional action is required. Consent to release the bond or termination of liability is not be granted until the terms and conditions have been met.

Geophysical Management - Monitoring

The most critical management practice is compliance monitoring during and after geophysical activity. Compliance inspections during the operation ensure that stipulations are being followed and identified impacts have been mitigated. Compliance inspections upon completion of work ensure that the operator has adhered to the agreed-upon practices to be followed.

OIL AND GAS LEASING

The Mineral Leasing Act provides that all public lands are open to oil and gas leasing unless a specific order has been issued to close an area. Based on the Federal Onshore Oil and Gas Leasing Reform Act of 1987, all leases must be offered for competitive sale.

Leases that are not purchased at a competitive sale are available for noncompetitive leasing for a period not to exceed two years. Competitive sales are held by oral auction at least quarterly.

Competitive leases are issued for a term of 5 years or for as long as oil and gas is produced. Noncompetitive leases are issued for a term of 10 years, or as long as production continues.

The federal government receives yearly rental fees on non-producing leases. Royalty on production is received on producing leases, one half of which is returned to the State of New Mexico.

DRILLING PERMIT PROCESS

Oil and gas operations on federal and Indian oil and gas leases are governed by procedures set forth by The Code of Federal Regulations issued under 43 CFR Part 3160, the Onshore Oil and Gas Orders, Notice to Lessees (NTLs) and direct orders of the authorized officer. Onshore Oil and Gas Order No. 1 lists the following as pertinent points to be followed by the lessee or operator: notice of staking (NOS); and application for permit to drill (APD), which includes a multi-point surface use and operations plan; approval of subsequent operations; well abandonment; water well conversion; responsibilities on privately owned surface; and reports and activities required after well completion.

The federal lessee or operating company selects the location of a proposed drill site. The selection of the site is based on spacing requirements, the subsurface geology as interpreted by geologists and geophysicists, the topography, and the availability of funds for a specific well. Spacing requirements are established by the New Mexico Oil and Gas Conservation Division (NMOCD). Each well is to be drilled within a given distance from the center of a legal subdivision, such as a quarter/quarter of a section or a quarter section, depending on the spacing assigned to the particular area. A proposed location may be moved within the tolerance, or outside the designated tolerance with a spacing exception granted by the NMOCD. Occasionally, the Bureau may request that a lessee drill a well on the lease if it is determined that federally owned minerals are being drained by an adjacent well on private or state owned minerals (USDI 1981a).

1. Notice of Staking - After the company makes the decision to drill a well, they must decide whether to submit a notice or APD. The notice consists of an outline of what the company intends to do including a location map and sketched site plan. The notice is then used as a document to review any conflicts with known critical resource values, and also used at the on-site inspection to provide the preliminary data to assess what additional items are necessary to complete the APD.

2. Application for Permit to Drill - The operator or lessee may submit a completed APD in lieu of notice of staking, but in either case no surface activity is conducted in conjunction with the drilling until the APD is approved by the Bureau.

Following the receipt of either an APD or a NOS, the BLM will schedule a field inspection with the operator and any other interested party. The purpose of the pre-site field inspection is to evaluate the operator's plan, to assess the situation for possible surface and subsurface impacts, and to formulate resource protection stipulations. To lessen environmental impacts, a site may be moved, reoriented, or redesigned, within certain limits, at the pre-site inspection. The proposed access road may also be rerouted (USDI 1981a). If necessary, site-specific mitigation measures are added to the APD for protection of surface and subsurface resource values in the vicinity of the proposed activity.

The BLM is responsible for preparing environmental documentation necessary to satisfy the National Environmental Policy Act requirements and provide any mitigation measures needed to protect the affected resource values.

Consideration is also given to the protection of ground water resources. When processing an APD, the geologist is required to identify the maximum depth of usable water as defined in Onshore Oil and Gas Order No. 2. Usable water is water containing 10,000 parts per million or less of total dissolved solids. Water of this quality is to be protected, usually by surface casing and cement.

Determining the depth to fresh water requires specific water quality data in the proposed well vicinity or geophysical log determination of water quality, depending on existing well proximity and log availability. If water quality data or logs from nearby wells are not available, the area within a 2-mile radius of the proposed well is checked for water wells. If wells exist, surface casing is required to be set below the deepest fresh water zone found in these wells or to reach a depth below the reasonably estimated level of usable water.

Contingency plans for the release of hydrogen sulfide gas (sour gas) are required for all drilling proposals that would penetrate a known or suspected hydrogen sulfide-bearing formation. These plans must provide for detection of hydrogen sulfide gas, countermeasures to control release of gas, control of access to the drill site, notification of law enforcement agencies, and evacuation of the public.

When final approval is given by the BLM, the operator may commence construction and drilling operations. Approval of an APD is valid for one year. If construction does not begin within one year, the stipulations must be reviewed prior to approving another APD (USDI 1981a).

Surface Disturbance Associated With Exploratory Drilling

Upon receiving approval to drill the proposed well, the operator moves construction equipment over existing roads to the point where the access road will begin. Generally, the types of equipment include track-mounted and rubber-tired dozers, scrapers, and motor-graders. Moving equipment to the construction site requires moving several loads (some overweight and overwidth) over public and private roads. Existing roads and trails are improved in places and occasionally culverts and cattleguards are installed if required.

The length of the access road varies. Generally, the shortest feasible route is selected to reduce the haul distance and construction costs. Environmental factors or the landowner's wishes may dictate a longer route. In rough terrain, the type of construction is sidecasting (using the material taken from the cut portion of the road to construct the fill portion); slightly less than one-half of the road bed is on a cut area and the rest is on a fill area. Roads in relatively level terrain are usually constructed with a 14-foot (single lane) running surface. Soil texture, steepness of the topography, and moisture conditions may dictate surfacing the access road in some places, but generally not for the entire length. The total acreage disturbed for each mile of access road constructed varies significantly with the steepness of the slope.

Well location constructed requires that all soil material suitable for plant growth be removed from areas to be disturbed and stockpiled in a designated area. Sites on flat terrain usually require little more than removing the topsoil material and vegetation. Drilling sites on ridge tops and hillsides are constructed by cutting and filling portions of the location. Excess cut material is stockpiled in an area that allows easy recovery for rehabilitation. It is important to confine extra cut material in stockpiles rather than cast it down hillsides and drainages where it cannot be recovered for rehabilitation.

The amount of level surface required for safely assembling and operating a drilling rig varies with the type of rig, but averages 250 feet by 250 feet.

In addition to the drilling platform, a reserve pit is constructed, usually square or oblong, but sometimes in another shape, to accommodate topography. Generally, the reserve pit is 8 to 12 feet deep, but may be deeper to compensate for smaller length and width or deeper drilling depths.

Depending on the relation of the location to natural drainages, it may be necessary to construct water bars or diversions. The area disturbed for construction and the potential for successful revegetation depends largely on the steepness of the slope.

Usually drilling activities begin within a few days to a week after the location and access road have been constructed. The drilling rig and associated equipment are moved to the location and erected. Moving a drilling rig requires moving 10 to 25 truck loads (some over legal weight and height) of equipment over public highways and private roads. Moving a smaller drilling rig requires moving fewer truck loads of equipment. The derrick when erected can vary according to how deep the hole is to be drilled. Very shallow holes require rigs less than 30 feet high, and very deep wells require rigs as high as 120 feet.

Water for drilling is hauled to the rig storage tanks or transported by surface pipeline. Water sources are usually commercial water stations. Occasionally, water supply wells are drilled on or close to the site. The operator must obtain a permit from the New Mexico State Engineer, if the well is within a declared water basin, for the use of surface or subsurface water for drilling. The BLM must also approve such use, when it holds the water rights for surface water. When drilling commences, and as long as it progresses, water is continually transported to the rig location. Approximately 40,000 barrels or 1,680,000 gallons of water are required to drill an oil or gas well to the depth of 9,000 feet. More water is required if the underground formations are fractured enough to permit water to escape into them (lost circulation zone) (USDI 1981a).

Issuance of Rights-of-Way

Rights-of-way are required for all facilities, tank batteries, pipelines, truck depots, power lines, and access roads that occupy federally owned land outside the lease or unit boundary. When a third party (someone other than the oil or gas company and the federal government) constructs a facility or installation on or off the lease, a right-of-way is also required. The right-of-way is issued by the BLM.

DRILLING OPERATIONS

The following is a simplified description of the processes and equipment used to drill oil and gas wells.

Applications for Permit to Drill (APDs) are approved for a one year period and may receive a one year extension if drilling has not started within the first year. In most cases drilling starts shortly after application approval. There are times when due to change of plans or unforeseen problems the drilling operations commence much later or not at all. The start of the drilling process, when the ground surface is first broken to start the hole is called "spudding." Sometimes the well is spudded before the drilling rig is in place and sometimes even before the site preparation has started or is complete. This early spudding is usually done to establish the well before a deadline such as a lease termination and normally is done with a rat hole rig, a small truck mounted machine used to drill shallow holes.

The cable tool rig and the rotary rig are the two types of rigs used to drill. The cable tool rig makes the hole at a slower rate and is limited to shallower depths, but is still occasionally used. The cable tool rig makes the hole by raising and dropping a heavy bit which pulverizes the ground where it hits. After enough ground is pulverized the bit is removed and a bailer is lowered into the hole to retrieve the cuttings.

Water is added, if not naturally in the hole, to turn the cuttings to mud thus facilitating the removal of the cuttings. The bailer is basically a pipe about 10 feet long, open at the top, with a one way valve at the bottom. When the bailer reaches the bottom of the hole the one way valve is pushed open allowing the cuttings solution to flow in to the bailer. The bailer is then lifted which shuts the valve and the cuttings are withdrawn from the hole and dumped into a pit. The bit is then reinstalled and the process repeated until the hole reaches the desired depth.

Although the drilling is slower, some operators like a cable tool rig because the drilled formation returns can be analyzed without being unduly contaminated by drilling mud. Also oil, water and other minerals are more easily detected. Normally cable tool rigs are used for shallow holes to a maximum of about 3,000 feet. Cable tools are normally only operated during day light hours.

Rotary drilling is the common method of drilling oil and gas wells. These rigs usually operate 24 hours a day and the drilling rate is much faster than cable tool drilling. The rigs come in different sizes with the size needed governed by the depth of the hole to be drilled. The smaller rigs are usually truck or trailer mounted, single piece units. The larger rigs break down to individual components to ease their transportation. A rotary rig makes the hole by boring into the ground with a rotating drilling bit attached to a drill stem. The cuttings are carried to the surface by a fluid.

The drilling bit makes the hole by grinding, pulverizing and scraping the formation. With cone type bits the drilling is done by three rotating cones, each containing rows of teeth or hardened steel inserts. As the bit rotates the great weight applied to the bit pulverizes the formation. At the same time, due to the bit design, the cones also grind and scrape the formation. There are different types of bits with the type and hardness of the teeth or buttons and cone size, angle, etc., designed for the type formation to be drilled. Some bits rely only on a scraping action to make the hole. One example is the diamond bit which has a rounded surface impregnated with diamond chips used to scrape through hard rock surfaces.

The drill bit is the first component in the drill stem. The drill collars are next and are used to provide weight on the drill bit. Drill collars are added when more weight is needed. Next is the drill pipe that is used to extend the drill stem as the hole is deepened. Both the drill collars and drill pipe are about to 30 feet in length. Physically, the drill collars are straight sided thick walled cylinders. The diameter of the drill pipe is reduced in the center section from the diameter of the ends where the pipe connections are made. The drill collars operate under compressive forces as they provide weight on the bit, while the drill pipe is kept under tension to prevent the pipe from buckling. The driller controls the weight on the bit observing a weight gauge that monitors the tension on the cable used to lift and lower the drill stem.

The last component of the drill stem is the kelly which is a pipe about 40 feet long that is square or hexagonal on the outside. The kelly is used to drive the drill stem. The kelly is rotated by the rotary table on the rig floor, which is driven by an electric motor or rig engine. The kelly is locked to the rotary table by removable blocks called kelly bushings which, when inserted in the rotary table, form a square or hexagon center to match the kelly used.

The components of the drill stem are attached together using tapered threaded connections. One end has the female threads, called the box end, the other end has the male treads, called the pin end. Sometimes different thread types are used in different parts of the drill stem. In those cases, connecting subs are needed to match the different threads.

All components of the drill stem have hollow centers through which drilling fluid is pumped. The drilling fluid is usually a mud. Sometimes compressed air or other gases are used to blow the cuttings out of the hole. The mud pumps draw the mud from the mud pits and push the mud through pipe to the rig, up a stand pipe along the rig mast to a rotary hose which attaches to a swivel on the upper end of the kelly. The mud then flows down through the drill stem and up the hole/drill stem annulus. After the mud leaves the hole it goes to a device called a shale shaker which removes the larger cuttings and then to the settling pits where the finer cuttings settle out. The flow rate is controlled to give the optimum sweeping capabilities.

Drilling mud has many functions, which include circulating the cuttings to the surface, cooling the drill bit, lubricating the drill stem, cleaning the bit, conditioning the hole, and controlling formation pressure. Drilling mud can be as simple as plain water or as complex as highly complicated blends designed for specific purposes. Some muds contain toxic materials. The more exotic blends can be very expensive, costing the company tens of thousands of dollars. The mud weight, measured in pounds per gallon, is changed to control anticipated formation pressures. When drilling into high pressure zones, a mud that is too light will not provide enough hydrostatic pressure to hold back the formation pressure and a blowout could occur. On the other hand, if the mud is too heavy, it could cause lost circulation by breaking down a formation or could harm a producing formation. The mud can also be used to carry lost circulation material. For example, chopped paper that is added to the mud is carried to a lost circulation zone that is then hopefully plugged by the lost circulation material.

As the well is drilled, casing is set at certain intervals. Casing is a steel pipe usually about 30 feet in length with diameters from 4.5 to 20 inches. The separate lengths of casing are connected by threaded collars. Casing is used to line the hole to stop the hole from collapsing, control well pressures, isolate different zones, stop the migration of fluids, and in some cases as a conduit for the produced or injected fluids. In designing the casing string the engineer considers the internal and external pressures and tension forces to which the casing will be subjected. Any corrosive effects that the formations and production may have on the casing also is considered. The diameter of the casing for each interval is determined by factors such as the well total depth, the number of strings to be run, the number of zones to be completed and type of production.

In some cases, an operator may decide to run a conductor pipe. A conductor pipe is an optional casing that is used to stop the upper hole from washing out during the drilling of the surface hole, which would otherwise be uncased. In this part of New Mexico, conductor pipe is usually a 20-inch outside diameter pipe set to about 40 feet and cemented to the surface using ready mix cement.

The strings of casing run can be divided by function into three basic types. The first string is the surface casing. The surface casing is required to cover all fresh water zones, but should not be set into deeper zones that could contaminate the fresh water. The cement in the surface casing annulus is required to be circulated to the surface.

The second type is the intermediate casing string. Its use is optional and it is usually only used on deep wells where there is a great distance between the surface casing and the producing zone or when there are problem areas that need to be isolated, such as lost circulation, water flows or other problems that would hamper the drilling process. Sometimes more than one string of intermediate casing is used. Intermediate casings are not required to be cemented to the surface, but the cement needs to isolate all possible water, oil and gas zones.

The third type is the production casing which is usually set through the producing zone with the well producing through perforated holes in the casing. Sometimes the production casing is set just above the producing zone and the well is produced through an open hole drilled into the producing zone. The cement behind the production casing does not need to be circulated but does need to isolate all water, oil and gas, and at a minimum is required to extend 500 feet above the upper-most perforated zone. Well production may be carried through the production casing, as in some gas wells, but most oil wells produce through tubing that runs to the surface.

There is one other type of casing called a liner that, unlike the other casing, does not run from its setting depth to the surface. This casing only extends about 200 feet into the casing above it and acts as an extension of that casing. Liners are usually used in very deep holes to reduce the handling problems and cost of running the casing to the surface.

The casing cementing is normally done by a separate service company. The initial cementing process involves pumping cement down the center of the casing, out of the bottom and up the annulus. After the full load of cement has been pumped into the casing a plug is pumped down the casing to push all the cement out of the bottom and into the annulus. The cement is prevented from flowing back into the casing by one way valves in the end of the casing. If the cement does not reach the desired height it can be brought further up the hole by perforating holes in the casing and squeezing cement in the annulus or by running a 1-inch inside diameter tubing down the annulus to the top of the cement and pumping cement into the annulus.

Another piece of equipment used while drilling is the blowout preventer (BOP) which is used to control the pressures encountered while drilling. The BOP is attached to the upper end of a casing that is cemented in the hole. The annular and the ram BOPs are the two basic types used. Annular preventers work by squeezing a synthetic rubber packing that will seal against any shape of pipe that is in the hole or will seal an open hole. The ram type preventer has two opposing rams that have synthetic rubber seals on the ends. Blind rams are straight edged and will seal an open casing. Pipe or casing rams need to have the ends changed to fit the drill pipe or casing that is in the hole. The BOPs come in different pressure ratings and may be stacked for optimum coverage. The BOPs are normally remotely controlled by hydraulic/pneumatic units, but ram types can be manually operated. The BLM requires different configurations and ratings based on the anticipated well pressures.

The completion process involves first determining if there is capability of production from the formations penetrated by the hole. This is done by analyzing the returns from the well bore and studying printouts of electric logs run in the well bore, usually prior to the running of the production casing. If there is no indication of possible production, the well will be plugged and abandoned if there is not another use for the well. If there is a possibility for production, the production casing is run and cemented and the zone of interest is perforated. Many wells will not produce until the formation is fractured (cracked by subjecting it to extremely high pressures) and by acidizing and treating it by forcing an acid solution and other liquid into the formation.

Once the well is ready to produce it is connected to the production equipment. If the well is incapable of production it is usually plugged unless there is approval given to temporarily abandon it or it can be used for other purposes. Plugging of the well requires prior approval.

DEVELOPMENT AND PRODUCTION

Wells are completed and production equipment installed if it is determined that oil or gas is present in commercial quantities. Oil of varying qualities is the primary product produced in the Roswell District. At present, approximately 67 percent of the producing wells in the District produce oil, and 33 percent produce natural gas.

Completion of a well calls for the installation of steel casing, which is cemented in, to provide stability and to protect specific underground zones. The casing is perforated into the zone or structure containing the oil or gas. The equipment installed on the casing of a producing well consists of various valves and pressure regulators which are used to control the oil or gas flow to production facilities.

Pipeline quality gas at the wellhead requires a minimum of processing equipment. As the quality of gas decreases with the increased presence of water, dissolved solids, or liquid hydrocarbons, the amount of processing equipment increases. Water or liquid hydrocarbons in the gas are removed before the gas is mixed with other gas, usually at the wellhead. If liquid hydrocarbons are present, storage facilities (tank batteries) are required for the liquids until they accumulate in sufficient quantities to be hauled out by large trucks.

Oil wells can be completed as flowing if there is sufficient underground pressure to raise the oil to the surface. If the pressure is inadequate, they are completed with the installation of pumps, usually pump jacks. Pump jacks come in a variety of sizes, the larger ones reaching a height of 30 to 40 feet. Pumps are powered by internal combustion engines or electric motors. Fuel for the engines may be casinghead gas or propane.

New Mexico law prohibits the flaring or venting of natural gas. Exceptions allowed by the New Mexico Oil and Gas Conservation Division are: 1) during testing of a new well, or 2) when the amount of gas produced with the oil is so small that pipeline construction is not practical. Otherwise, if a well produces both oil and gas, provisions for shipping the gas must be made before oil production can continue.

The production equipment, heater-treater, holding facility for production water (if any is present), and tank battery, are either placed on a portion of the location (on cut rather than fill) or located a short distance from the wellhead along the access road. Production facility colors are required to be from the standard color chart. The heater-treater and tanks are surrounded by earthen dikes to contain accidental spills. Either all the facilities may be fenced, or only the production water pit may be fenced (USDI 1981a).

Oil and Gas Exploratory Units

Surface use in an oil or gas field may be affected by unitization of the leaseholds. Unitization of leaseholds often include lands in which the minerals may be privately, state and federally owned. When an exploratory unit is formed, a wildcat exploratory well is drilled. The boundary of the unit is based on geologic data. The developers of the unit can enter into an agreement to develop and operate as a unit, without regard to separate lease ownerships. Costs and benefits are allocated according to agreed-upon terms.

Development in a unitized field may proceed more slowly than in a field composed of individual leases. In the former case, all owners within the participating area share in any well's production. In the latter, each lessee must drill his own well to obtain production.

Unitization reduces the surface use requirements because all wells are operated as though on a single lease. Duplication of field processing facilities is minimized, because development and operations are planned and conducted by a single operator. Power lines are often distributed throughout the unit and diesel engines are converted to electric motors. Unitization may also involve wider spacing than usual, resulting in fewer wells. Access roads are usually shorter and better organized (USDI 1981a).

It is the general intent of unitization to pool or unitize the interests in an entire structure or area. This provides adequate control of operations so that development and production can proceed in the most efficient and economical manner, and with minimized environmental impact. Accordingly, each proposal to unitize federally supervised leases must be evaluated upon its specific merits. The unit agreement provides for the exploration, development, and production by a single operator. In effect, the unit functions as one very large lease.

The purpose for the formation of a unit is to conserve the natural resources of the pool, field, or area involved. The early consolidation of separate exploration and development efforts through unitization of separate leasehold interests eliminates the need (with respect to drainage) to drill protective wells along common boundaries between unitized leases and serves to maximize benefits through a continuing exploration and development program.

Many fields go through several development stages. A field may be considered fully developed and produce for several years. Later, a well may be drilled to a deeper pay zone. Discovery of a new pay zone in an existing field is called a pool discovery, as distinguished from a new field discovery. A pool discovery may lead to the drilling of additional wells. Existing wells may also be drilled deeper.

A new stage of field development can lead to changes in locations of roads and facilities. All new construction, reconstruction, or alterations of existing facilities-including roads, dams, pits, flowlines, pipelines, tank batteries, or other production facilities must be approved by the BLM.

As the productive life of a field progresses, problems may arise such as erosion; unvegetated areas; washing out of drainage crossings and roads; plugging of culverts; deterioration of cattleguards; accumulation of derelict equipment; construction of unnecessary roads; unauthorized off-road travel; and improperly placed or unreclaimed pipelines. The BLM prepares reclamation plans to correct these problems and to return the field surface area to its original productivity. By taking adequate corrective action as problems arise, total reclamation can be accomplished within an acceptable time period after a field is completely exhausted (USDI 1981a).

Field Development

The most important factor in further development of an oil or gas field is the quantity of production. Other considerations are whether the field is on a lease basis or unitized, the probability of profitable production, the necessity to protect federal mineral acreage from drainage by off-lease drilling, and the degree to which limits of the field are known.

When an oil or gas discovery is made, a well spacing pattern must be established before development drilling begins. Well spacing is regulated by the New Mexico Oil and Gas Conservation Division. Factors considered in the establishment of a spacing pattern include data from the discovery well concerning: porosity, permeability, pressure, composition, and depth of formations in the reservoir; well production rates and type (barrels of oil or cubic feet of gas); and the economic effect of the proposed spacing on recovery.

The standard minimum spacing for oil production on federal leases is 40 acres. Spacing for oil wells usually varies from 40 to 80 acres per well. Spacing for gas wells is generally from 160 to 320 acres per well. Spacing requirements can pose problems in selecting an environmentally sound location. Reservoir characteristics and the method of extraction determine the most efficient spacing to achieve maximum production. If an operator determines that a different spacing is necessary to achieve maximum recovery, the state and federal agencies may grant exceptions to the spacing requirements. Exceptions may also be obtained for an "unorthodox" location in the case of significant surface conflicts which are not able to be resolved, provided no geologic or legal problems are encountered. The procedures for obtaining approval to drill and for the drilling of development wells are generally the same as those for wildcat (exploration) wells.

As more wells are placed in production, roads are improved by regular maintenance, surfacing with caliche and installing drainage crossings. Mineral materials that are obtained from areas of federally owned minerals require a sales contract and are processed through the Resource Area where the materials occur.

Production from several wells on one lease may be carried by pipeline to a central tank battery. Use of a central tank battery depends on whether or not the oil is from the same formation, and whether or not the partners of stockholders are the same. If commercial quantities of gas are produced with the oil, feeder lines are constructed to carry it to transportation lines.

Production

Gas, oil, and water are being produced in the Roswell District by means of natural flow and artificial lift (electric pumping units, gas pumping units, and submersible pumping units).

Gas Production: A typical gas well location consists of a wellhead, a separator (which separates gas, oil, and water), a dehydrator (uses heat and glycol or CaCl to extract any water remaining with the gas), and an orifice meter. An intermitter is sometimes used to either shut-in the well to build up pressure or to blow the well down if it is being loaded with fluid. If the gas well is producing some oil or condensate, oil tanks are used to store the oil and condensate until it is sold and transported via truck or pipeline.

Gas which occurs with oil is separated by venting it out the top of the tank battery and into feeder lines leading to transportation lines. If enough casinghead gas is separated to make it economical for marketing, a plant may be constructed to process the gas, or a pipeline may be constructed to carry the product to an existing plant. If the volume of casinghead gas is insufficient to warrant treatment in a gas plant, it is usually used as fuel for pump engines in the field or as heating fuel for the heater-treaters. Gas is flared or vented into the atmosphere if it exceeds the fuel requirements on the lease but is not of commercial quantities.

Oil Production: In the Roswell District, oil is usually produced using artificial lift methods (pump units). Generally, production from a number of wells is treated at a central tank battery. Due to the nature of this oil, adequate separation of oil and water is only obtained through successive applications of heat. The fluid stream arrives at a separator point where the flash gas is taken off and in most cases, this flash gas is used for lease operations. Flash gas is solution gas liberated from the oil due to expansion. The remainder of the flash gas is either compressed and sold or flared. Water and oil are also being separated at this point. The oil is dumped in storage tanks and the water is sent to a disposal facility. If the water content of the oil is too high due to emulsion, then the oil is recirculated back to the separator, where heat is applied again, and the process continues until the oil is clean. Two main methods of oil measurement are used: lease automatic custody transfer meters and tank gauging. Measurement is required by 43 CFR 3162.7-2 and Onshore Order No. 4 to ensure proper and full payment of the federal royalty.

Operators employ various energy sources and techniques to produce oil and gas economically. Some of the larger units are electronically controlled through a central computer facility. Pump jacks are run by electricity or gas. Solar power units are employed by some operators to run instrumentation. Compressors are sometimes required to produce wells and meet pipeline pressure.

Water Production: Water produced with the oil or gas is disposed by trucking the water to an authorized disposal pit, by placing the water in lined pits, or through subsurface injection. The quality of the water often dictates the appropriate disposal method. The produced water is also sometimes used in enhanced recovery projects.

Production Problems: Weather extremes pose problems for producers by causing roads to become impassable, equipment to malfunction, and flowlines, separators, and tanks to freeze. Other problems producers face are: H_2S, CO_2, paraffin, corrosion, electrolysis, and burst flowlines.

Primary Recovery

An oil reservoir typically contains oil, gas, and water trapped within fine rock pores under tremendous pressures. Because of the pressure, much or all of the gas and water is dissolved in the oil. Primary recovery is production from a reservoir by natural energy resulting from the expansion of pressurized water and gas in solution, which forces oil out of the pores into the well and up to the surface. Oil flowing out of the rock drains energy from the formation, pressure in the reservoir begins slowly to decline, primary drive diminishes, and the production rate falls. As reservoir pressures continue to drop, gas in the oil escapes forming bubbles in the rock pores. This further retards the flow of oil and, in time, flow nearly ceases. At this point, as much as 80 percent of the original oil may still remain in the reservoir. To keep oil flowing, pressure from within the reservoir is required. Pumps may be used to lift oil to the surface.

Secondary and Enhanced Oil Recovery

Currently, in the United States, the primary method of oil recovery accounts for less than half of the current oil production. The rest is produced using secondary and enhanced recovery techniques. These techniques increase recovery of oil above that attainable by normal recovery.

Secondary recovery is the extraction of oil from a field beyond what can be recovered by normal methods of flowing pumping. There are two basic secondary recovery methods in use: 1) water flooding and 2) displacement by gas. The most common secondary recovery method in use is water flooding. Water flooding is the process of injecting large volumes of water into oil reservoirs where primary recovery has fallen or is expected to be low. Water replaces the volume of oil extracted and provides a driving force while maintaining reservoir pressure. Water, which does not mix with oil, generally leaves about half the original oil behind in the form of small droplets trapped by capillary forces in the rock pores.

The process of injecting gas into the producing zone of a well is a less common secondary recovery technique. Historically, produced gas was considered a wasted product and it was flared (burned) at the point of production. Later, it was recognized that energy could be conserved and the recovery of oil increased if the produced gas was re-injected into the producing zone. This increased production was achieved by: 1) maintaining reservoir pressure by injecting the gas into the existing gas cap, and 2) by injecting the gas directly into the oil saturated zone, creating an immiscible gas drive which displaced the oil.

The term "enhanced recovery" is used to describe recovery processes other than the more traditional secondary recovery procedures. These enhanced recovery methods include chemical and miscible (mixable) CO_2 drives.

There are several chemical drive techniques currently in use, including 1) polymer flooding, 2) caustic flooding, and 3) surfactant-polymer injection. These methods attempt to change reservoir conditions to allow additional oil to be recovered.

In the recent past carbon dioxide, which is miscible with oil, has been used to enhance oil recovery. Carbon dioxide mixes with the oil in a reservoir, allowing for greater displacement of oil from the rock matrix.

There are enhanced recovery projects active in the Roswell District at this time. Chemical or CO_2 drives are likely to be tried in some fields in the future.

Plugging and Abandonment of Wells

The purpose of plugging and abandoning a well is to prevent fluid migration between zones, to protect minerals from damage, and to reclaim the surface. Each well has to be handled individually due to a combination of factors, including geology, well design limitations, and specific reclamation concerns. Therefore, only minimum requirements can be established, then modified for the individual well.

The first step in the plugging process is the filing of the Notice of Intent to Abandon. The Notice must be filed and approved prior to plugging a past producer. Verbal plugging instructions can be given for plugging current drilling operations, but a Notice must be filed after the work is completed. If usable fresh water was encountered while the well was being drilled, the surface management agency will be allowed, if interested, to assume future responsibility for the well and the operator will be reimbursed for the attendant costs. In this situation, the well would be plugged back at a minimum to the bottom of the fresh water protection casing.

The operator's plan for securing the hole is reviewed by the BLM. The plugging of a well is conducted according to the requirements of Onshore Oil and Gas Order #2, and any local requirements prescribed by the BLM's authorized officer.

In the event that the casing has been cut and recovered, plugs are to be placed 50 feet above and below the cut off point. Annular space that extends to the surface will not be left open to the drilled hole below, as 100 feet of cement must be placed in the annulus.

If the integrity of a plug is questionable or the position extremely vital, it can be tested with pressure or by tagging the plug with the drill string. Tagging the plug means running pipe into the hole until the plug is encountered and placing a certain amount of weight on the plug to verify its placement and competency. The surface plug must be a minimum of 100 feet and no less than 25 sacks of cement. The interval between plugs must be filled with mud, 9 pounds per gallon minimum.

After the casing has been cut off below the ground level, any void in the top of the casing must be filled. If a metal plate is welded over the top of.the casing, weep holes should be drilled in the plate to vent the annular spaces.

A permanent abandonment marker is required on all wells unless otherwise requested by the surface management agency. This marker pipe is usually at least 4 inches in diameter, 10 feet long, 4 feet above the ground, and embedded in cement. The pipe must be capped with the well identity and location permanently inscribed.

The surface management agency is responsible for establishing and approving methods for surface reclamation and determining when this reclamation has been satisfactorily accomplished. At this point, a Subsequent Report of Abandonment can be approved.

SUBSURFACE PRACTICES

The success (or failure) of subsurface operations cannot be determined by simply "looking down the hole," but instead, must be judged from indirect evidence such as downhole logs, drilling data, completion data, and many other data sets. Competent professionals are required to determine the character and adequacy of "downhole" operations. A downhole failure may take many years before the ramifications become apparent at the surface; by that time, the situation may be irreversible.

Prior to 1982, the USGS was responsible for subsurface management and initiated many standards and policies for oil and gas development on federal mineral lands. Since 1982, the fluid minerals branch of the BLM has been responsible for subsurface management.

Casing and Cementing

The use of standards is difficult because cost is a factor and any job can be overdesigned. Many gray areas exist where experts argue the merits of one design over another. One of these controversial design areas is hole size relative to casing size. It is questionable if a proper cement bond can be obtained under these circumstances. Hole deviation, depth, bore hole environment, placement of centralizers (if any), and myriad other factors affect the integrity of the casing and cement job. One of the most important factors influencing a "cement job" is the pumping method. Cement can be pumped and placed in any of three flow regimes: plug flow, laminar flow, and turbulent flow. The flow regime is a function of the velocity at which the slurry flows. Plug flow has a very slow velocity and takes the most time to pump. Turbulent flow requires high hydraulic horsepower and some service companies cannot pump cement in turbulent flow under certain conditions.

Blowout Prevention

Today, special attention is paid to blowout prevention; much of the equipment associated with drilling rigs is for handling excess pressure at the surface. Blowout prevention equipment is tested and inspected regularly by both the rig personnel and the inspection and enforcement branch of the BLM. Minimum standards and enforcement provisions are currently in effect as part of Onshore Order No. 2. Well-trained rig site personnel are a necessity for proper blowout prevention.

Casing setting depth is also important with regards to blowout prevention. The casing shoe must be set in rock which is competent to withstand the maximum anticipated pressure to which it will be exposed.

APPENDIX 16
THREATENED OR ENDANGERED SPECIES CARLSBAD RESOURCE AREA

This appendix describes the threatened or endangered plant and animal species in the Carlsbad Resource Area.

TABLE 16A-1
SPECIAL STATUS SPECIES
FOR THE CARLSBAD RESOURCE AREA

Common Name	Scientific Name	Status
Fish		
Pecos Bluntnose Shiner	Notropis simus pecosensis	FT SE
Pecos Pupfish	Cyprinodon pecosensis	FC1 SE
Pecos Gambusia	Gambusia nobilis	FE SE
Greenthroat Darter	Etheostoma lepidum	SE
Bigscale Logperch	Percina macrolepida	SE
Mexican Tetra	Astyanax mexicanus	SE
Blue Sucker	Cycleptus elongatus	FC2 SL
Gray Redhorse	Moxostoma congestum	SE
Reptiles		
River Cooter	Pseudemys concinna	SE
Blotched Water Snake	Nerodia erythrogaster	SE
Arid Land Ribbon Snake	Thamnophis proximus	SE
Mottled Rock Rattlesnake	Crotalus lepidus lepidus	SE
Birds		
Ferruginous Hawk	Buteo regalis	FC2 SS
Bald Eagle	Halliaeetus leucocephalus	FE SE
Pereqrine Falcon	Falco peregrinus	FE SE
Common Black-Hawk	Buteogallus anthroacinus	ST
Aplomado Falcon	Falco femoralis	FE SE
Least Tern (interior)	Sterna antillarum athalassos	FE SE
Western Snowy Plover	Charadrius alexandrinus aivosus	FC2
Mountain Plover	Charadrius montanus	FC2
Longbilled Curlew	Numenius americanus	FC2
White-Faced Ibis	Plegadis chihi	FC2
Bell's Viereo	Vireo bellii	ST
Gray Vireo	Vireo vincinor	ST
Varied Bunting	Passerina versicolor	ST
Baird's Sparrow	Ammondramus bairdii	St
Loggerhead Shrike	Lanius ludovicianus	FC2
Brown Pelican	Pelecanus occidentalus	FE SE
Southwestern Wilow Flycatcher	Empidonax trailli extimus	FC2
Mollusk		
Pope's Mussel	Popenaias popei	SE
Ovate Vertigo	Vertigo ovata	SE
Pecos Spring Snail	Fontelicella pecosensis	SE
Pecos Assiminea	Assiminea pecos	SE

Note: FE=Federal Endangered; FT=Federal Threatened; FC1=Federal Category 1; FC2=Federal Category 2; FC3=Federal Category 3; SE=State Endangered Group and SL=State Endangered List.

TABLE 16A-1
SPECIAL STATUS SPECIES
FOR THE CARLSBAD RESOURCE AREA (CONTINUED)

Common Name	Scientific Name	Status
Invertegrates		
Noel's Amphipod	Gammarus desperatus	FC2 SE
Pecos Assiminea Snail	Assiminea pecos	FC1 SE
Mammals		
Spotted Bat	Euderma maculatum	FC2 ST
Great Western Mastiff Bat	Eumops perotis californicus	FC2
Sanborn's Long-Nosed Bat	Leptonycteris sanborni	FE
California Leaf-Nosed Bat	Macrotus californicus	FC2
Occult Little Brown Bat	Myotis lucifugus occultus	FC2
Southwestern Cave Bat	Myotis velifer brevis	FC2
White Sands Woodrat	Meotoma micropus leucophaea	FC2
Plants		
Sneed Pincushion Cactus	Corphantha sneedii var. sneedii	FE SE
Scheer's Pincushion Cactus	Coryphantha scheeri var. scheeri	SE
Lee's Pincushion Cactus	Coryphantha sneedii var. leei	FT SE
Threadleaf False Carrot	Aletes filifolius	SS
Tharp's Bluestar	Amsonia tharpii	FC2 SE
Chapline's Columbine	Aquilegia chapleinei	FC3 SE
Guadalupe Mountain Aster	Aster laevis var. quadalupensis	FC2 SS
Gypsum Milkvetch	Astragalus gypsodes	FC3 SS
Kuenzler's Hedgehog Cactus	Echinocereus fendleri var. kuenzleri	FE SE
Lloyd's Hedgehog Cactus	Echinocereus lloydii	FE SE
Button Cactus	Epithelantha micromeris	SE
Gypsum Buckwheat	Eriogonum gypsophilum	FT SE
Prairie Gentian	Eustoma grandiflora	SE
Catchfly Gentian	Eustoma exaltatum	SE
McKittrick Pennyroyal	Hedema apiculatum	SE
Shining Coral-Root	Hexalectris nitida	FC2 SS
Crested Coral-Root	Hexalectris spicata	SE
Wright's Justica	Justicia Wrightii	FC2 SS
Gypsum Blazing Star	Mentzelia perennis	SS
Guadalupe Milkwort	Polygala rimulicola var. rimulicola	SE
Desert Rose	Rosa stellata var. stellata	FC3
Guadalupe Mountain Mescal	Sophora gypsophila bean var. guadalupensis	FC3
Texas Tobaccoroot	Valeriana texana	FC3 SS

Note: FE=Federal Endangered; FT=Federal Threatened; FC1=Federal Category 1; FC2=Federal Category 2; FC3=Federal Category 3; SE=State Endangered Group and SL=State Endangered List.

APPENDIX 17

THREATENED OR ENDANGERED SPECIES ROSWELL RESOURCE AREA

This appendix describes the threatened or endangered plant and animal species in the Roswell Resource Area.

TABLE A17-1
SPECIAL STATUS SPECIES OCCURRING OR POTENTIALLY OCCURRING IN THE ROSWELL RESOURCE AREA

Common Name	Scientific Name	Status
Fish		
Pecos Pupfish	Cyprinodon pecosensis	FC1 SE2
White Sands Pupfish	Cyprinodon tularosa	FC2 SE2
Pecos Gambusia	Gambusia nobilis	FE SE2
Pecos Bluntnose Shiner	Notropis simus pecosensis	FT SE2
Rio Grande Shiner	Notropis jemezanus	FC2
Rio Grande Bluntnose Shiner	Notropis simus simus	SE1
Arkansas River Shiner	Notropis girardi	FC2 SE2
Bigscale Logperch	Percina macrolepida	SE2
Rio Grande Silvery Minnow	Hybognathus amarus	SE2
Mexican Tetra	Astyanax mexicanus	SE2
Greenthroat Darter	Etheostoma lepidum	SE2
Canadian Speckled Chub	Hybopsis aestivalis tretranemus	SE2
Suckermouth Minnow	Phenacobius mirabilis	SE2
Reptiles		
Texas Horned Lizard	Phrynosoma cornatum	FC2
Dune Sagebrush Lizard	Sceloporus graciosus arenicolus	FC2 SE2
Western Ribbon Snake	Thamnophis proximus	SE2
Birds		
Bald Eagle	Haliaeetus leucocephalus	FE SE2
Ferruginous Hawk	Buteo regalis	FC2
American Peregrine Falcon	Falco peregrinus anatum	FE SE1
Northern Aplomado Falcon	Falco femoralis septentrionalis	FE SE1
Mexico Spotted Owl	Strix occidentalis lucida	FPT
Southwestern Will Flycatcher	Empidonax traillii extimus	FC2 SE2
Interior Least Tern	Sterna antillarum athalassos	FE SE1
Western Snowy Plover	Charadrium alexandrinus nivosus	FC2
Mountain Plover	Charadrium montanus	FC2
White-faced Ibis	Plegadis chihi	FC2
Long-billed Curlew	Numenius americanus	FC2
Olivaceous Cormorant	Phalacrocorax olivaceous	SE2
Brown Pelican	Pelicanus occidentalis	SE1
Bell's Vireo	Vireo bellii	SE2
Gray Vireo	Vireo vicinoir	SE2
Baird's Sparrow	Ammodramus bairdii	SE2

Note: FE=Federal Endangered; FT=Federal Threatened; FC1=Federal Category 1; FC2=Federal Category 2; SL1=State Endangered List 1; SL2=State Endangered List 2; SE1=State Endangered Group 1; SE2=State Endangered Group 2.

TABLE A17-1
SPECIAL STATUS SPECIES OCCURRING OR POTENTIALLY OCCURRING IN THE ROSWELL RESOURCE AREA (CONTINUED)

Common Name	Scientific Name	Status
Invertebrates		
Pecos Assiminea Snail	Assiminae pecos	FC1 SE1
Noel's Amphipod	Gammarus desperatus	FC2 SE1
Mollusk		
Koster's Spring Snail	Tryonia kosteri	FC2 SE2
Roswell Spring Snail	Fontelicella roswellensis	FC1 SE1
Mammals		
Black-footed Ferret	Mustela nigripes	FE
Swift Fox	Vulpes velox	FC2
AZ Black-tailed Prairie Dog	Cyomys ludovicianus arizonensis	FC2
Least Shrew	Cryptotis parva	SE2
Occult Little Brown Bat	Myotis lucifigus occultus	FC2
Plants		
Kuenzler Hedgehog Cactus	Echinocereus fendleri var. kuenzleri	FE SL1
Pecos Sunflower	Helianthus paradoxus	FC1 SL1
Grama Grass Cactus	Pediocactus papyracanthus	FC2
Guadalupe Valeria	Valeriaa texana	FC2 SL2
Kerr's Milkvetch	Astragalus kerrii	FC2 SL1
Button Cactus	Epithelantha micromeris	SL1
Wright's Fish-hook Cactus	Mammillaria wrightii	SL1
Catchfly Gentian	Eustoma exaltatum	SL1
Prairie Gentian	Eustoma grandiflorum	SL1

Note: FE=Federal Endangered; FT=Federal Threatened; FC1=Federal Category 1; FC2=Federal Category 2; SL1=State Endangered List 1; SL2=State Endangered List 2; SE1=State Endangered Group 1; SE2=State Endangered Group 2.

APPENDIX 18
IMPACT ANALYSIS ASSUMPTIONS

This appendix describes the assumptions used in the analysis of impacts expected from the actions described in the various alternatives.

ASSUMPTIONS AND GUIDELINES FOR IMPACT ANALYSIS

General

Short-term impacts are those occurring within ten years. Long-term impacts are those extending beyond ten years. The cumulative impacts are those anticipated over the life of the Resource Management Plan, which is about 20 years.

Minerals

Oil and Gas Management (District-wide)

The Reasonably Foreseeable Development (RFD) projections for the Carlsbad and Roswell Resource Areas (Tables A18-1 and A18-2) contain estimates of the number of wells drilled and the resulting acres of disturbance in each resource area over a 20-year period. The development of the RFD is based on the following assumptions and information.

1. Oil and gas activity would occur in accordance with continuing management guidance.
2. Oil and gas leasing laws and regulations would not change substantially over the next 20 years.
3. New leasing and/or development is based on RFD projections.
4. The RFD projections have a 20-year life.
5. Based on historical drilling trends, there will be a "boom" period of increased drilling followed by a decrease in exploration and development, sometime during the life of the plan.

The RFD projections are based on an analysis of potential development. The following information was used in this analysis:

1. Areas available for leasing and development.
2. The potential for oil and gas occurrence (potential for occurrence does not imply or refer to the likelihood of development, extraction, or economic favorability).
3. Existing oil and gas practices.
4. Existing leases and related industry exploration and development activities.

Based on actual well counts by year, at least 42,811 wells have been drilled between the years 1904 and 1991 in southeastern New Mexico. The bulk of these wells were drilled after 1920.

The RFD projections are concerned with the total number of oil and gas wells, access roads, pipelines, and power lines projected to be developed during the next 20 years in the Roswell District. The RFD projection for the next 20 years represents projected disturbed acreage and well numbers including one "Boom-and Bust" cycle.

The projected total number of wells was determined by using historical well data. Historical well data was obtained from New Mexico Oil Conservation Division (NMOCD) and BLM records. Total projected wells include wells from all categories of mineral estate ownership, unless otherwise indicated.

The RFD projections consist of Federal wells regardless of surface management or ownership. In

TABLE A18-1
PROJECTED FEDERAL DRILLING ACTIVITY (1992-2012)AND ASSOCIATED SURFACE DISTURBANCE
CARLSBAD RESOURCE AREA
ALL ALTERNATIVES

A. Most Probable Future Projection[1]	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Federal Wells Drilled	213	194	228	273	254	320	337	314	267	296	322	230	165	192	141	188	238	206	213	194
2. Expected Producers[2]	181	165	194	232	216	272	286	267	227	252	274	196	140	163	120	160	202	175	181	165
3. Expected P&A	32	29	34	41	38	48	51	47	40	44	48	34	25	29	21	28	36	31	32	29
4. Abandoned Producers[3]	23	20	30	33	27	30	31	32	28	29	35	30	22	31	21	20	19	16	23	20
5. Total Producers (9,464 as of 1/1/93)	9,622	9,767	9,931	10,130	10,319	10,561	10,816	11,051	11,250	11,473	11,712	11,878	11,996	12,128	12,227	12,367	12,550	12,709	12,867	13,012
6. Acres Disturbed by New Wells[4]	1,770	1,613	1,896	2,268	2,111	2,659	2,798	2,610	2,219	2,462	2,677	1,913	1,370	1,595	1,172	1,563	1,976	1,711	1,770	1,613
7. Acres Actually Stabilized during Year[5]	919	908	933	874	793	936	1,100	1,028	1,237	1,304	1,234	1,044	1,116	1,230	877	660	769	578	755	916
8. Total Disturbed Acres at end of this Year[6] (36,342 as of 1/1/93)	37,193	37,898	38,861	40,255	41,573	43,296	44,994	46,576	47,558	48,716	50,159	51,028	51,282	51,647	51,942	52,845	54,052	55,185	56,200	56,897
9. Net Surface Disturbance for this Year[7]	851	705	963	1,394	1,318	1,723	1,698	1,582	982	1,158	1,443	869	254	365	295	903	1,207	1,133	1,015	697
10. Residual Surface Disturbance Resulting from Wells Drilled During this Year.[8]	692	631	741	887	826	1,040	1,095	1,021	868	962	1,047	748	536	624	458	611	773	669	692	631
11. Cumulative Residual Disturbance Due to O&G Development Since 1993	692	1,323	2,064	2,951	3,777	4,817	5,912	6,933	7,801	8,763	9,810	10,558	11,094	11,718	12,176	12,787	13,560	14,229	14,921	15,552

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[1] Success Ratio = 0.85; [2] Projected from Historic Records, Source: MSA; [3] Base + Line 2 - Line 4. [4] (Line 2 x 9.0 Acres/Well) + (Line 3 x 4.4 Acres/Well). [5] (Line 3 x 2.0 Acres/Well) + (Line 4 x 1.5 Acres/Well) + (Line 2 (3rd year previous) x 4.1 acres/well). (Assumption of 200 producing wells/yr for Pre-93). [6] Base + Line 6 - Line 7; [7] Line 6 - Line 7; [8] Line 2 x 3.4 Acres/Well + Line 3 x 2.4 Acres/Well.

TABLE A18-2
PROJECTED FEDERAL DRILLING ACTIVITY (1992-2012) AND ASSOCIATED SURFACE DISTURBANCE
ROSWELL RESOURCE AREA
ALL ALTERNATIVES

A. Most Probable Future Projection[1]	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Federal Wells Drilled	35	46	38	52	64	91	161	252	132	98
2. Expected Producers[1]	25	33	27	37	46	66	116	181	95	71
3. Expected P&A	10	13	12	15	18	25	45	71	37	27
4. Abandoned Producers[2]	4	7	5	8	6	6	10	20	18	17
5. Total Producers (1,328 as of 1/1/93)[3]	1,349	1,375	1,397	1,426	1,466	1,526	1,632	1,793	1,870	1,924
6. Acres Disturbed by New Wells[4]	269	354	296	399	493	704	1,242	1,941	1,018	758
7. Acres Stabilzed during Year[5]	108	119	114	145	180	170	257	361	372	555
8. Total Disturbed Acres at end of this Year[6] (6655 as of 1/1/93)	6,816	7,051	7,233	7,487	7,800	8,334	9,319	10,899	11,545	11,748
9. Net Surface Disturbance for this Year[7]	161	235	182	254	313	534	985	1,580	646	203
10. Residual Surface Disturbance Resulting from Wells Drilled during this Year.[8]	109	143	121	162	200	284	502	786	412	306
11. Cumulative Residual Disturbance Due to O&G Development Since 1993	109	252	373	535	735	1,019	1,521	2,307	2,719	3,025

A. Most Probable Future Projection[1]	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Federal Wells Drilled	76	41	63	52	36	40	23	28	35	46
2. Expected Producers[1]	55	30	45	37	26	29	17	20	25	33
3. Expected P&A	21	11	18	15	10	11	6	8	10	13
4. Abandoned Producers[2]	18	6	11	12	6	8	5	13	4	7
5. Total Producers (1,328 as of 1/1/93)[3]	1,961	1,985	2,019	2,044	2,064	2,085	2,097	2,104	2,125	2,151
6. Acres Disturbed by New Wells[4]	587	318	484	399	278	309	179	215	269	354
7. Acres Stabilzed during Year[5]	811	420	344	274	152	219	171	142	145	106
8. Total Disturbed Acres at end of this Year[6] (6655 as of 1/1/93)	11,524	11,422	11,562	11,687	11,813	11,903	11,911	11,984	12,108	12,356
9. Net Surface Disturbance for this Year[7]	-224	-102	140	125	126	90	8	73	124	248
10. Residual Surface Disturbance Resulting from Wells Drilled during this Year.[8]	237	128	196	162	112	125	72	87	109	143
11. Cumulative Residual Disturbance Due to O&G Development Since 1993	3,262	3,390	3,586	3,748	3,860	3,985	4,057	4,144	4,253	4,396

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[1] Success Ratio = 0.72; [2] Projected from Historic Records, Source: MSA; [3] Base + Line 2 - Line 4. [4](Line 2 x 9.0 Acres/Well) + (Line 3 x 4.4 Acres/Well).; [5](Line 3 x 2.0 Acres/Well) + (Line 4 x 1.5 Acres/Well) + (Line 2 (3rd year previous) x 4.1 acres/well). (Assumption of 20 wells/yr for Pre-93); [6]Base + Line 6 - Line 7; [7]Line 6 - Line 7; [8]Line 2 x 3.4 Acres/Well + Line 3 x 2.4 Acres/Well.

TABLE A18-1
PROJECTED FEDERAL DRILLING ACTIVITY (1992-2012)AND ASSOCIATED SURFACE DISTURBANCE
CARLSBAD RESOURCE AREA
ALL ALTERNATIVES

A. Most Probable Future Projection[1]	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Federal Wells Drilled	213	194	228	273	254	320	337	314	267	296
2. Expected Producers[2]	181	165	194	232	216	272	286	267	227	252
3. Expected P&A	32	29	34	41	38	48	51	47	40	44
4. Abandoned Producers[3]	23	20	30	33	27	30	31	32	28	29
5. Total Producers (9,464 as of 1/1/93)	9,622	9,767	9,931	10,130	10,319	10,561	10,816	11,051	11,250	11,473
6. Acres Disturbed by New Wells[4]	1,770	1,613	1,896	2,268	2,111	2,659	2,798	2,610	2,219	2,462
7. Acres Actually Stabilized during Year[5]	919	908	933	874	793	936	1,100	1,028	1,237	1,304
8. Total Disturbed Acres at end of this Year[6] (36,342 as of 1/1/93)	37,193	37,898	38,861	40,255	41,573	43,296	44,994	46,576	47,558	48,716
9. Net Surface Disturbance for this Year[7]	851	705	963	1,394	1,318	1,723	1,698	1,582	982	1,158
10. Residual Surface Disturbance Resulting from Wells Drilled During this Year.[8]	692	631	741	887	826	1,040	1,095	1,021	868	962
11. Cumulative Residual Disturbance Due to O&G Development Since 1993	692	1,323	2,064	2,951	3,777	4,817	5,912	6,933	7,801	8,763

A. Most Probable Future Projection[1]	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Federal Wells Drilled	322	230	165	192	141	188	238	206	213	194
2. Expected Producers[2]	274	196	140	163	120	160	202	175	181	165
3. Expected P&A	48	34	25	29	21	28	36	31	32	29
4. Abandoned Producers[3]	35	30	22	31	21	20	19	16	23	20
5. Total Producers (9,464 as of 1/1/93)	11,712	11,878	11,996	12,128	12,227	12,367	12,550	12,709	12,867	13,012
6. Acres Disturbed by New Wells[4]	2,677	1,913	1,370	1,595	1,172	1,563	1,976	1,711	1,770	1,613
7. Acres Actually Stabilized during Year[5]	1,234	1,044	1,116	1,230	877	660	769	578	755	916
8. Total Disturbed Acres at end of this Year[6] (36,342 as of 1/1/93)	50,159	51,028	51,282	51,647	51,942	52,845	54,052	55,185	56,200	56,897
9. Net Surface Disturbance for this Year[7]	1,443	869	254	365	295	903	1,207	1,133	1,015	697
10. Residual Surface Disturbance Resulting from Wells Drilled During this Year.[8]	1,047	748	536	624	458	611	773	669	692	631
11. Cumulative Residual Disturbance Due to O&G Development Since 1993	9,810	10,558	11,094	11,718	12,176	12,787	13,560	14,229	14,921	15,552

[1]Success Ratio = 0.85; [2]Projected from Historic Records, Source: MSA; [3]Base + Line 2 - Line 4. [4](Line 2 x 9.0 Acres/Well) + (Line 3 x 4.4 Acres/Well). [5](Line 3 x 2.0 Acres/Well) + (Line 4 x 1.5 Acres/Well) + (Line 2 (3rd year previous) x 4.1 acres/well). (Assumption of 200 producing wells/yr for Pre-93). [6]Base + Line 6 - Line 7; [7]Line 6 - Line 7; [8]Line 2 x 3.4 Acres/Well + Line 3 x 2.4 Acres/Well.

TABLE A18-2
PROJECTED FEDERAL DRILLING ACTIVITY (1992-2012) AND ASSOCIATED SURFACE DISTURBANCE
ROSWELL RESOURCE AREA
ALL ALTERNATIVES

A. Most Probable Future Projection[1]	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Federal Wells Drilled	35	46	38	52	64	91	161	252	132	98
2. Expected Producers[1]	25	33	27	37	46	66	116	181	95	71
3. Expected P&A	10	13	12	15	18	25	45	71	37	27
4. Abandoned Producers[2]	4	7	5	8	6	6	10	20	18	17
5. Total Producers (1,328 as of 1/1/93)[3]	1,349	1,375	1,397	1,426	1,466	1,526	1,632	1,793	1,870	1,924
6. Acres Disturbed by New Wells[4]	269	354	296	399	493	704	1,242	1,941	1,018	758
7. Acres Stabilzed during Year[5]	108	119	114	145	180	170	257	361	372	555
8. Total Disturbed Acres at end of this Year[6] (6655 as of 1/1/93)	6,816	7,051	7,233	7,487	7,800	8,334	9,319	10,899	11,545	11,748
9. Net Surface Disturbance for this Year[7]	161	235	182	254	313	534	985	1,580	646	203
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A. Most Probable Future Projection[1]	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
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2. Expected Producers[1]	55	30	45	37	26	29	17	20	25	33
3. Expected P&A	21	11	18	15	10	11	6	8	10	13
4. Abandoned Producers[2]	18	6	11	12	6	8	5	13	4	7
5. Total Producers (1,328 as of 1/1/93)[3]	1,961	1,985	2,019	2,044	2,064	2,085	2,097	2,104	2,125	2,151
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7. Acres Stabilzed during Year[5]	811	420	344	274	152	219	171	142	145	106
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10. Residual Surface Disturbance Resulting from Wells Drilled during this Year.[8]	237	128	196	162	112	125	72	87	109	143
11. Cumulative Residual Disturbance Due to O&G Development Since 1993	3,262	3,390	3,586	3,748	3,860	3,985	4,057	4,144	4,253	4,396

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[1] Success Ratio = 0.72; [2] Projected from Historic Records, Source: MSA; [3] Base + Line 2 - Line 4. [4](Line 2 x 9.0 Acres/Well) + (Line 3 x 4.4 Acres/Well).; [5](Line 3 x 2.0 Acres/Well) + (Line 4 x 1.5 Acres/Well) + (Line 2 (3rd year previous) x 4.1 acres/well). (Assumption of 20 wells/yr for Pre-93); [6]Base + Line 6 - Line 7; [7]Line 6 - Line 7; [8]Line 2 x 3.4 Acres/Well + Line 3 x 2.4 Acres/Well.

determining the Federal portion of the RFD projections, percentages of wells by ownership category (i.e., Federal, state, fee) was used. The total number of wells forecast was multiplied by the percentage identified for Federal wells to obtain the projected number of Federal wells. Normal spacing for oil wells is 40 acres, 160 acres for shallow gas wells, and 320 acres for deep gas wells.

In counties with little or no oil and gas development, well data was either absent or inadequate to determine reasonable forecasts. In an effort to project reasonable development, the RFD projection was based on industry interest and an assessment of oil and gas potential.

To provide a basis for the analysis of the cumulative impacts of oil & gas development and exploration, it is also necessary to review actions anticipated on private lands within the oil fields. Anticipated oil field development activities could affect federal acres within the developed oil fields. The following summation is an aggregate of disturbance resulting from activity on both federal and private lands unless indicated otherwise. Many of the affected acres on private lands have already been disturbed by historic oil field operations.

In the Roswell District, there is a yearly average of 729 producing oil pools, each having an average of 26 producing oil wells and 5 injection wells. There is a yearly average of 486 producing gas pools, each having an average of 7 wells each.

Developmental wells average 503 oil, 203 gas, and 28 injection wells completed per year. Of these, an average of 382 oil, 162 gas and 21 injection wells are new completions.

For the purposes of analysis, oil and gas well disturbances were treated equally. Each newly drilled well is expected to result in an initial average surface disturbance of about 4.4 acres which includes disturbance from the pad and associated access road. About 12 percent of these wells are not expected to be successful. In these cases, approximately 2 of the 4.4 disturbed acres would be successfully reclaimed as soon as the developmental drilling operation was completed. There would be additional disturbance for each new producing well from associated pipelines and power lines. This is expected to result in about 4.6 additional acres of disturbance per well, for a total of 9 acres surface disturbance per producing well. Approximately 4.1 acres of the total disturbed area (9 acres) would be reclaimed and stabilized after a period of 3 years. Approximately' 85 percent of developmental wells drilled are expected to be successful and would be put into production.

During the 20 year analysis period, about 94 producing wells per year would be abandoned. This would result in the reclamation of about 1.5 of the 4.9 acres per well that are currently occupied by production facilities.

It is expected that 60 to 125 wildcat wells will be drilled each year over the next 20 years, on both federal and private lands, in areas of high or moderate oil and gas potential. The discovery (success) rate on these wells is estimated to be 47 percent. Of the successful wildcat wells drilled, approximately 21 oil and 24 gas wells will be completed per year. Each completed well would result in the temporary disturbance of up to 9 acres.

An average of 52 new oil or gas fields could be discovered per year, but it is anticipated these new fields would most likely be in areas where the surface is already disturbed by other development activities. These new fields could result in up to 31 new development wells with a total surface disturbance of up to 279 acres.

The most likely occurrence in areas of low oil and gas potential is minimal oil and gas exploration or development activity. Based on past drilling records, there were 7 wells drilled during the 38 year period between 1952 and 1989. There is a chance that there could be two to four exploratory wells resulting in the temporary disturbance of up to 36 acres.

The following is a summary of wells drilled during the period of 1975-1992. This summary includes oil, gas, and plugged and abandoned (P&A) wells. These numbers include wells in all ownership categories (Federal, State, and fee) unless indicated otherwise.

Roswell District

In the Roswell District, there were 14,544 new well completions during the 18 years between 1975 and 1992 period. This is an average of 808 new well completions per year for the district. During this same period, 2,641 or 18 percent of these new well completions were P&A, an average of 147 P&A wells per year. Of new well completions, there were 7,635 new oil wells drilled in the Roswell District during the 18 year period. Of these new oil wells, 394 or 5 percent were wildcat wells; the rest were development wells. There were 3,400 new gas wells drilled in the Roswell District during this 18 year period. Of these new wells, 428 or 13 percent were wildcat wells; the rest were development wells. During the 18 year period, there were an additional 868 other new wells, including injection, salt water disposal, and temporarily abandoned wells. Based on past drilling history in the Roswell District, 39.5 percent of wells drilled were on Federal lands.

Oil wells drilled per yr -> 7,635 wells ÷ 18 yrs = 424 oil wells/yr
Gas wells drilled per yr -> 3,400 wells ÷ 18 yrs = 189 gas wells/yr
Total P&A wells per year -> 2,641 wells ÷ 18 yrs = 147 wells/yr
Other wells -> 868 wells ÷ 18 yrs = 48 wells/yr
Total New Wells drilled/yr -> 14,544 wells ÷ 18 yrs = 808 wells/yr

Federal Oil wells drilled/yr -> 424 wells/yr x .395 = 167 oil wells/yr
Federal Gas wells drilled/yr -> 189 wells/yr x .395 = 75 gas wells/yr
Federal P&A wells/yr -> 147 wells/yr x .395 = 58 wells/yr
Other Federal wells -> 48 wells/yr x .40 = 19 wells/yr
Federal wells drilled/yr -> 808 wells/yr x .395 = 319 wells/yr

Wildcats (Oil) per yr (5%) -> 394 wells ÷ 18 yrs = 21 wildcats/yr
Wildcats (Gas) per yr (13%) -> 428 wells ÷ 18 yrs = 24 wildcats/yr
Federal Wildcats (Oil)/yr -> 21 wells x .395 = 8 wildcats/yr
Federal Wildcats (Gas)/yr -> 24 wells x .395 = 9 wildcats/yr

Roswell Resource Area (RRA)

In the RRA, 3,318 of the wells drilled in the Roswell District were drilled as new well completions during the 18 year period, an average of 184 new well completions per year for the RRA. During this same time frame, 951 or 29 percent of new well completions were P&A. This is an average of 53 P&A wells per year. Based on past drilling history in the Roswell Resource Area, 40 percent of wells drilled were on Federal lands. There were 1,008 new oil wells drilled in the resource area during the period 1975-1992. Of these wells, 75 or 7 percent were wildcat wells; the rest were development oil wells. During the 18-year period, there were 1,261 new gas wells drilled in the resource area. Of these wells, 151 or 12 percent were wildcat wells; the rest were development gas wells. During the 18 year period, there were an additional 98 other new wells, including injection, salt water disposal, and temporarily abandoned wells.

Total Oil wells drilled/yr -> 1,008 wells ÷ 18 yrs = 56 oil wells/yr
Total Gas wells drilled/yr -> 1,261 wells ÷ 18 yrs = 70 gas wells/yr
Total P&A wells per year -> 951 wells ÷ 18 yrs = 53 wells/yr
Other wells -> 98 wells ÷ 18 yrs = 5 wells/yr
Total wells drilled per year -> 3,318 wells ÷ 18 yrs = 184 wells/yr

Federal Oil wells drilled/yr -> 56 wells/yr x .40 = 22 oil wells/yr
Federal Gas wells drilled/yr -> 70 wells/yr x .40 = 28 gas wells/yr
Federal P&A wells/yr -> 53 wells/yr x .40 = 21 wells/yr
Other Federal wells -> 5 wells/yr x .40 = 2 wells/yr
Federal wells drilled/yr -> 184 wells/yr x .40 = 74 wells/yr

Total Wildcats (Oil)/yr -> 75 wells ÷ 18 yrs = 4 wildcats/yr
Total Wildcats (Gas)/yr -> 151 wells ÷ 18 yrs = 8 wildcats/yr
Federal Wildcats (Oil)/yr -> 4 wells x .40 = 2 wildcats/yr
Federal Wildcats (Gas)/yr -> 8 wells x .40 = 3 wildcats/yr

Carlsbad Resource Area (CRA)

In the CRA, 11,226 wells were drilled as new well completions during the 1975-1992 period, for an average of 624 new well completions per year. During this same period, 1,688 or 15 percent of these new well completions were P&A, an average of 94 P&A wells per year. Based on past drilling history in the Carlsbad Resource Area, 39 percent of wells drilled, were on Federal lands. There were 6,627 new oil wells drilled in the resource area during the period of 1975-1992. Of these wells, 319 or 5 percent were wildcat wells; the rest were development wells. During the 18-year period, there were 2,247 new gas wells drilled in the resource area. Of these wells, 385 or 17 percent were wildcat wells; the rest were development wells. During the 18 year period, there were an additional 664 other new wells, including injection, salt water disposal, and temporarily abandoned wells.

Total Oil wells drilled/yr -> 6,627 wells ÷ 18 yrs = 368 oil wells/yr
Total Gas wells drilled/yr -> 2,247 wells ÷ 18 yrs = 125 gas wells/yr
Total P&A wells per year -> 1,688 wells ÷ 18 yrs = 94 wells/yr
Other wells -> 664 wells ÷ 18 yrs = 37 wells/yr
Total wells drilled per year -> 11,226 wells ÷ 18 yrs = 624 wells/yr

Federal Oil wells drilled/yr -> 368 wells x .39 = 144 oil wells/yr
Federal Gas wells drilled/yr -> 125 wells x .39 = 49 gas wells/yr
Federal P&A wells/yr -> 94 wells/yr x .39 = 37 wells/yr
Other Federal wells -> 37 wells/yr x .39 = 14 wells/yr
Federal wells drilled/yr -> 624 wells/yr x .39 = 243 wells/yr

Total Wildcats (Oil)/yr -> 319 wells ÷ 18 yrs = 18 wildcats/yr
Total Wildcats (Gas)/yr -> 385 wells ÷ 18 yrs = 22 wildcats/yr
Federal Wildcats (Oil)/yr -> 18 wells x .39 = 7 wildcats/yr
Federal Wildcats (Gas)/yr -> 22 wells x .39 = 9 wildcats/yr

Surface Disturbance from Oil and Gas Development

The following assumptions for access roads, drill pads, pipelines, power lines, and seismic activity were used to estimate surface disturbance impacts associated with oil and gas exploration and development drilling activities. Stabilization of surface disturbance is expected to occur within three years.

Access Roads: 14 foot-wide travelway, three acres disturbance per access road, one acre disturbance stabilized per access road per well.

Drill Pads: 1.4 acres disturbance per average well pad (250' x 250'), 1.0 acre stabilized per abandoned well.

Pipelines: 3.6 acres initial disturbance per producing well (30' right-of-way width), 2.6 acres stabilized per producing well, 0.5 acres stabilized per abandoned producing well.

Power lines: 1.0 acre initial disturbance per producing well, 0.5 acres stabilized per well.

Statistics on drilling activity and surface disturbance assumptions were used to project acres of disturbance, stabilization, and net long-term disturbance for the planning area. Disturbance estimates are based on the most probable future projection of drilling activity on federal lands for the next 20 years.

Approximately one acre is disturbed per mile of geophysical line. In the RRA, approximately 150 miles of new geophysical lines are anticipated per year. In the CRA, approximately 700 miles of new geophysical lines are anticipated per year. Reclamation of disturbance is expected to occur within 3-5 years.

Locatable Minerals

Locatable mineral development is expected to result in less than 100 acres of surface disturbance per year or 2000 acres over the next 20 years. Fifty acres would be reclaimed per year assuming an 80 percent success rate on revegetation, for a total of forty acres. Residual impacts of this type of disturbance would affect ten acres annually or 200 acres over the next 20 years.

Mining of locatable minerals in the Roswell and Carlsbad Resource Areas is very nominal. Many of the operators and claimants who have submitted Notices (five acres or less of surface disturbance) would continue to do so at a rate of up to five per year. Operators and claimants have very rarely submitted Plans (over five acres surface disturbance), and if submitted, may do so at the rate of one every five years.

New mining claims may be filed on relinquished mining claims and on new areas at a rate of as many as 100 per year.

Solid Leasable Minerals

The likelihood of future development is minimal. The RRA can expect to issue approximately one to ten exploration permits per year.

Saleable Minerals

In the Roswell and Carlsbad Resource Areas, there are approximately 192 and 1262 existing mineral material pits, respectively, affecting a total of about 384 acres in Roswell and 2524 acres in Carlsbad.

The average mineral material pit is approximately 300' x 300', or about two acres in size. Five new pits, affecting approximately two acres each, would be opened in each resource area annually.

The revegetation success rate in reclamation is assumed to be 80 percent.

All lands, except those identified otherwise, would be open to mineral material disposals.

New mineral material extraction (sand, gravel, caliche, etc.) for road construction and oil field activities would cause about 200 acres of total disturbed ground over 20 years.

Demand for mineral materials is expected to continue to be dependent on the amount of oil and gas activity occurring. The location and size of mineral material pits would also depend on the amount of oil and gas activity. A smaller demand is also expected around communities within the RRA for local use. The location and size of mineral material pits would also depend on the growth rate of the local communities, the location and size of local projects and the quantity and quality of material needed for specific projects. Suitable material for most activities can be found throughout the resource area.

The total amount of material requested would vary from 10,000 to 500,000 loose cubic yards per year.

The amount of material disposed of within the RRA would range from 2,500 to 500,000 loose cubic yards per year. The amount of material (due to oil and gas development) disposed of within the CRA would range from 90,000 to 150,000 cubic yards per year.

LANDS AND REALTY

There are approximately 10,000 acres currently under right-of-way authorization in the RRA. An estimated total of 100 rights-of-way, permits, and leases would disturb approximately 600 additional acres of land over a 20-year period. These figures do not include rights-of-way approved under Applications for Permit to Drill (generally roads or pipelines). The majority of pipelines, road rights-of-way, and permits are located in association with oil and gas production areas. Only one major pipeline (10 inches or greater in diameter), disturbing about 33 acres, is expected to be built across public lands in the planning area over the next 20 years.

A single land use permit (250 X 125) would be issued each year, with resulting disturbance of approximately 1.5 acres per site, or a total of 15 acres over the life of the plan.

An average of one non-linear right-of-way (communication site or facility) would be issued every five years, with the resulting disturbance of about 1.5 acres per site.

It is assumed that four or five easements would be acquired annually.

Over the life of the plan it is anticipated that up to 150,000 acres would be transferred to private ownership. Although a large-scale, rapid, land tenure adjustment program is unlikely, both land sales and exchanges would be expected to increase.

LIVESTOCK GRAZING

In the Roswell Resource Area, it is anticipated that about 1227 AUMs would be lost over the life of plan as a result of oil and gas surface disturbing activities, such as well pad, road, and pipeline construction, and mineral material pits on approximately 7365 acres. Forage loss is figured by assuming an average carrying capacity of six acres per AUM in the Roswell Resource Area. The loss of 1227 AUMs of forage production would affect 102 Cows Yearlong (CYL) over the life of the plan.

In the Carlsbad Resource Area, it is anticipated that about 7661 AUMs would be lost over the life of plan as a result of oil and gas surface disturbing activities and mineral material pits on approximately 53,628 acres. Forage loss is figured by assuming an average carrying capacity of seven acres per AUM in the Carlsbad Resource Area. The loss of 7661 AUMs of forage production would affect 638 Cows Yearlong (CYL) over the life of the plan.

It is anticipated that about 188 acres would be disturbed in the Roswell Resource Area for rangeland fences and pipelines, while water developments would affect about 75 acres.

CULTURAL RESOURCES

Cultural resources eligible or potentially eligible for inclusion in the National Register of Historic Places will continue to be avoided when discovered.

OUTDOOR RECREATION

Recreation

Societal values concerning recreation are changing in the United States rapidly. Recreation use of public lands are increasing at a steady and sometimes alarming rate. Twenty years ago, public lands were primarily used for ranching and mineral extraction. Visitors are now discovering the unique and valuable resources on BLM-administered lands. Today the public views BLM lands as special areas where there are numerous and challenging recreational opportunities and unique biological communities to view. With this increased demand for use of the public lands, conflicts arise. Conflicts between the recreating public and industry are now at the forefront. Conflicts also exist between recreation user groups. In the future, the BLM must make prudent management decisions that strike a balance between the needs of the visiting public, industry and the protection and use of the resource.

All recreation use on public lands is expected to increase at a rate of 10 to 15 percent each year. The demand includes public land for mountain biking, hiking, camping, picnicking, horseback riding, viewing of cultural sites, wildlife viewing, hunting and driving pleasure.

Off-Highway Vehicles

The demand for OHV use areas is expected to hold steady or slowly increase over the life of the plan.

Caves

Recreational cave use is expected to increase at a steady rate within the Resource Area. An increase of recreational use of caves would require limiting some activities to meet health and safety standards and protect the cave resources. A greater demand on the cave resources by commercial guides and outfitters is anticipated in the future.

Wilderness

The two Wilderness Study Areas, Little Black Peak and the Carrizozo Lava Flow (25,312 acres), will be managed under interim management guidelines until Congress designates them wilderness or releases the areas from wilderness consideration.

The interior portions of the lava flow are not conducive to grazing, mineral development, mineral leasing and/or mineral sales. Lava rocks do have a high decorative value for landscaping around buildings and for roads. There is a sufficient amount of lava flow outside of the WSA's to fill this need when demand arises.

Mineral development could occur in WSA's and wilderness areas on unpatented mining claims subject to the mining laws. Mineral leasing in WSA's and wilderness areas would not likely be authorized. Mineral material sales for common variety minerals would not be allowed in the WSA's or wilderness areas. If these uses were allowed to occur within the WSA's or wilderness areas they would degrade and disrupt the naturalness, solitude, and opportunities for primitive and unconfined types of recreation.

Land acquisition would have beneficial effects on wilderness resources and management by enabling the BLM to consolidate Federal ownership in wilderness areas. Acquisition of lands identified in the Wilderness Study Report would ensure that any uses of those lands would be compatible with the maintenance of the wilderness resource. Wilderness lands would not be disposed.

WATERSHED

Assumptions Made in the Soil Loss Analysis.

1. General assumptions (see Chapter 4) concerning the number, timing, area, and type of surface-

disturbing activities were used in the soil loss analyses.

2. The Revised Universal Soil Loss Equation (RUSLE) was used to predict soil losses due to rill and interrill erosion (Soil and Water Conservation Society 1993).

3. Estimates are for soil losses only; they do not indicate sediment yields (see Glossary).

4. The absolute values of the erosion estimates have little meaning other than giving the order of magnitude of soil loss that can be expected. The impacts of each proposed action *relative* to the other alternatives, and to all other sources is the important information.

5. Soil loss estimates are made for rill and interrill erosion only. Although other processes are significant in southeast New Mexico, (e.g. gullying, sloughing of channel banks, etc.), quantifying these effects is difficult. However, a study of 157 watersheds indicated that 73 percent of sediment yield was from rill/interrill erosion, 10 percent from gully erosion, and 17 percent from other sources, such as road cut/fill, streambanks, and floodplain scour (Branson et al. 1972). Therefore, it is assumed that soil losses due to other sources are proportional to soil losses due to rill/interrill erosion.

6. Soil loss estimates depend on site specific conditions. For proposed future actions that could take place in a variety of locations (e.g. construction of oil and gas well pads), representative site conditions based on past activity were used.

7. Baseline levels of soil loss (i.e. soil losses that would occur without a disturbance) are accounted for in the analyses by subtracting the baseline estimates from the soil loss estimate associated with disturbance.

8. The baseline soil loss estimate is assumed to be indicative of past management because they are based on existing vegetative cover conditions. The existing vegetation condition is a result of past management.

9. Wind erosion is difficult to predict with much precision for large heterogeneous areas, such as the Roswell Resource Area. Therefore, expected wind erosion will be estimated only for site-specific conditions where wind erosion has a particularly high potential, such as Mescalero Sands.

WILDLIFE

An increase in number of T/E species listed by USFWS is expected over the next 20 years, including new recovery plans which will affect management of BLM-administered lands.

The Dune sagebrush lizard, as state-listed endangered species can be found throughout the shinnery oak/dune habitat type. Because studies have not been completed, the total acreage of shinnery oak in conjunction with dunes was considered to be potential habitat.

Prairie Chickens

There are an estimated 200 Prairie chicken leks in the Roswell RA. It is assumed that all of these leks are used at one time or another. The optimum prairie chicken lek density in core areas is 12 per section. There are four "core areas" for prairie chickens in the Roswell Resource Area:

Kenna Area	46,000 acres
Davis/McCombs	70,400 acres
Core Area	86,400 acres
Bogle/Malmstrom	42,200 acres
Total	245,000 acres

There are 25 active leks in the Carlsbad RA.

FIRE MANAGEMENT

Approximately 5,200 acres of wildfire occur in the Resource Area annually.

SURFACE USE AND OCCUPANCY REQUIREMENTS

The estimates of acreages affected by the various surface use and occupancy requirements (see Tables A3-1 and A3-2) were derived using the following assumptions.

Except where noted, federal surface acres were used in the assumptions. The number of townships in the resource areas are "equivalent townships," which were calculated from total federal surface acreage.

Wildlife Habitat Projects: For the Carlsbad Resource Area (CRA) the actual size in acres was used if the projects were large, otherwise the projects were assumed to be a point. There are 95 projects. In the Roswell Resource Area (RRA), projects were assumed to average 1 acre in size; there are 56 projects.

Raptor Nests and Heronries: For the CRA, heronries were assumed to be included in the acreage figures for playa lakes, so there is not separate acreage for heronries. For CRA raptor nests east of the Pecos River, there are an estimated 16 nests per 10 square kilometers, based on studies. There are assumed to be three 10-meter units per township in 51 townships east of the Pecos River, giving a total of 2,448 nests. For CRA raptor nests west of the Pecos River, there are assumed to be five nests per township in 44 townships, giving a total of 220 nests. west of the river. Based on these assumptions, there are 2,668 raptor nests in the CRA. For the RRA, there are assumed to be three nests per township in 65 townships, for a total of 195 nests.

Slopes: Slope information was derived from GIS data. Since the data covers all surface ownerships, the estimates of acreages affected also reflect all surface ownerships.

Streams, Rivers and Floodplains: Data was derived from GIS files. Linear miles of major perennial and ephemeral streams were computed from the GIS data, for public lands. In the CRA, there are an estimated 205 stream miles on public lands; there are 206 stream miles in the RRA. For purposes of analysis, the average width of a 100-year floodplain was assumed to be one-quarter mile, including the water course. This is intended to account for floodplains of as many as three miles wide in places along the Pecos River, and narrow (perhaps only a few feet), incised floodplains along some important ephemeral drainages.

Playa Lakes: For the CRA acreage estimates are based on an average size of about 29 acres for 174 playas. For the RRA acreage estimates are based on an average size of 45 acres for 56 playas.

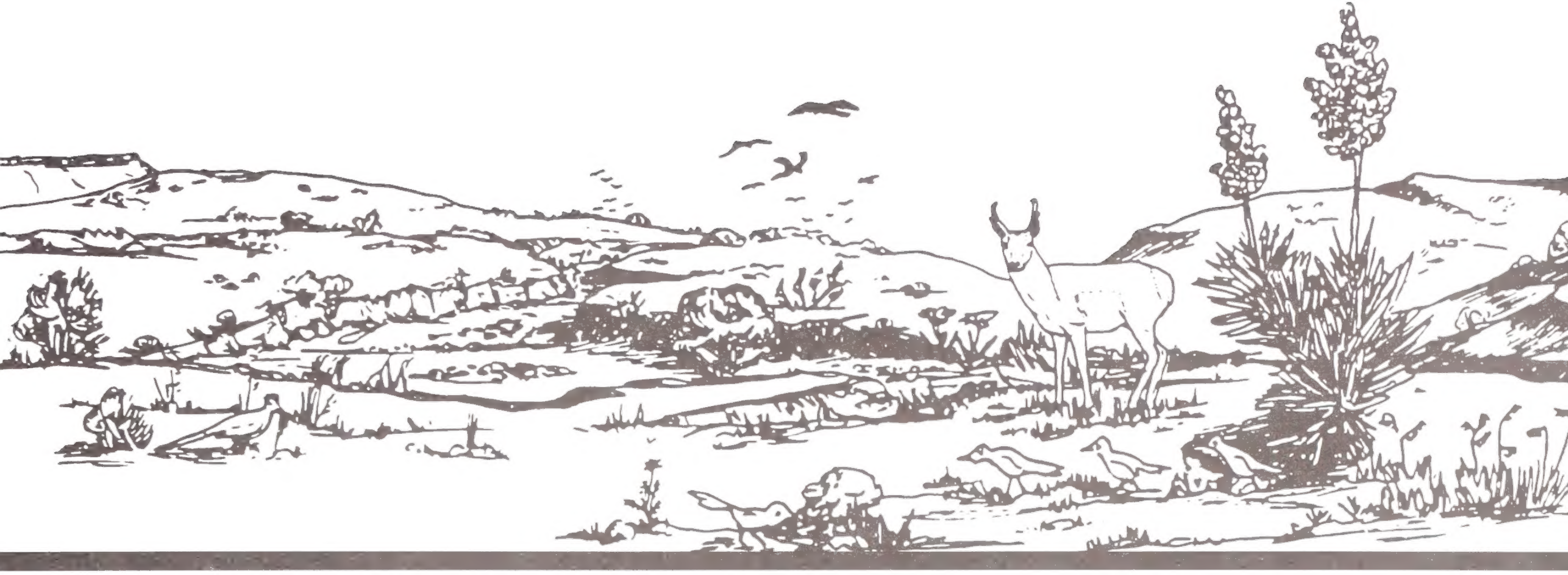
Springs, Seeps and Tanks: There are an estimated 20 springs or seeps and 200 tanks in the Roswell RA, each assumed to affect about one acre each. In the Carlsbad RA, there are 17 springs or seeps and 200 tanks, which also affect about 1 acre each.

Caves and Karst: For the Carlsbad Resource Area, 180 significant caves were identified. An average length of 280 feet per cave was computed from cave data. Caves in designated Special Recreation Management Areas and in the Dark Canyon Cave Protection Zone were not included in the estimate of significant caves. There are an estimated 1,000 significant karst features, each averaging 300 feet in diameter.

For the Roswell Resource Area, 158 significant caves were identified, each with an average length of 318 feet. Caves included in the Roswell Cave Complex ACEC were not included the estimate of significant caves. There are an estimated 500 significant karst features in the Roswell RA, each averaging 150 in diameter.

Prairie Chickens: Prairie chicken leks are assumed to be points for the determination of acreage affected by the surface use and occupancy requirements. There are 25 leks in the Carlsbad Resource Area and 200 leks in the Roswell Resource Area.

Sand Dune Sagebrush Lizard: Until studies are completed to establish significant and occupied habitat, the potential habitat of the lizard was used for analysis purposes. Potential habitat is based on Soil Conservation Service descriptions for Deep Sand and Sand Hills range sites.



GLOSSARY

ACQUIRED LANDS. Lands in Federal ownership which were obtained by the government through purchase, condemnation, gift, or exchange.

ACRE-FOOT (AC-FT). Volume of water that will cover one acre of land to a depth of one foot; equals 43,560 cubic feet or 325,851 gallons.

ADJUDICATION. A formal court proceeding which results in the determination of the validity and extent of a water right.

AERIAL PHOTOGRAPHY. Photographs taken of the earth's surface from an aircraft. Both color and infra-red aerial photos can be produced which show surface features. Photographs can indicate vegetation changes and water content associated with fractures where caves may be located.

AGGREGATE. Any of several hard, inert materials, such as sand, gravel, slag, or crushed stone, used for mixing with a cementing or bituminous material to form concrete, mortar, or plaster; or used alone, as in railroad ballast or graded fill.

AIR POLLUTION. The general term alluding to the undesirable addition of substances (gases, liquids, or solid particles) to the atmosphere that are foreign to the natural atmosphere or are present in quantities exceeding natural concentrations.

ALKALI LAKES. Shallow plate-like depressions in central portions of basins that drain internally, collect runoff and evaporate rapidly; salt playas.

ALLOTMENT. An area of land designated and managed for grazing of livestock.

ALLOTMENT MANAGEMENT PLAN (AMP). A livestock grazing activity plan for a specific allotment based on multiple-use resource management objectives. The AMP considers livestock grazing in relation to other uses of the rangelands and in relation to renewable resources (i.e., watershed, vegetation and wildlife). An AMP includes the seasons of use, number of livestock permitted on the allotment, grazing system, and the rangeland developments needed. AMPs are prepared in consultation, cooperation and coordination with the permittee(s), lessee(s) or other involved affected parties.

ANIMAL UNIT MONTH (AUM). The amount of forage necessary for the sustenance of one cow with a nursing calf or its equivalent for a period of one month.

ANNUAL WATER YIELD. The total streamflow volume that passes a specified point in a watershed during a year. It generally equals total precipitation and irrigation, less evapotranspiration losses and deep seepage losses.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and provide safety from natural hazards.

AUTHORIZED OFFICER. Any person authorized by the Secretary of the Interior to administer regulations.

AVOIDANCE AREA. An environmental sensitive area where rights-of-way would be granted only in cases where there is a prevailing need and no practical alternative location exists, and then only with appropriate provisions to protect the sensitive environmental components.

BENEFICIAL USE. The basis, the measure, and the limit of a water right. Agricultural, commercial, industrial, and recreational uses are all considered to be beneficial.

BEST MANAGEMENT PRACTICE (BMP). Methods, measures, or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained to its highest practicable level. BMPs include, but are not limited to structural and nonstructural controls, operations, and maintenance procedures. BMPs can be applied before, during, or after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 CFR 130.2, EPA Water Quality Standards Regulation). Each BMP should identify: (1) specific management objectives, (2) a thorough description of the practice(s) to be used, and (3) a plan for monitoring the effectiveness of the practice(s) toward meeting the stated objectives, so they can be refined over time. Examples of specific BMPs for New Mexico rangelands are given by New Mexico State University (1983).

BIODIVERSITY. Refers to the variety of life and its processes and includes the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.

BRANDENHEAD TEST. A test that verifies the integrity of the production casing in an oil or gas well and ensures that hydrocarbon fluids from uncemented intervals behind the production casing are not accumulating in the annular space and migrating uphole. A bradenhead test involves shutting in the well-head valves on the tubing-production casing annulus and on the casing-casing annuli for a specified time period (typically 24 hours). The valves are then reopened one at a time to detect pressure build-up or fluid flow. Whenever pressure or fluid flow is detected, it indicates that some communication is occurring.

CALICHE. A brown or white material commonly found as a subsoil deposit in arid or semi-arid climates which is composed largely of calcium carbonate.

CAVE EXPLORATION. The act of entering a naturally occurring void, cavity, recess or system of interconnected passages which occurs beneath the surface of the earth, ledge, or cliff to investigate, study or analyze contents, hazards and extent; to travel into new territories for adventure or discovery.

CLASSIFICATION OF LANDS. The process of determining whether the lands are more valuable or suitable for transfer or use under particular or various public land laws than for retention in federal ownership for management purposes.

COMMUNITY. A group of plants and animals living together in a common area having close interactions.

COMMUNITY PIT. A site from which nonexclusive disposals of mineral materials can be made.

CONDITIONAL WILDFIRE SUPPRESSION. The point in time that the fire exceeds the definable boundaries of the prescribed natural fire parameters, conditional suppression will become full suppression. (Total acres will not be a concern but exceeding the defined boundaries will indicate an escaped fire analysis.)

CONSERVATION (ARCHAEOLOGY). A level of management applied to cultural resources exhibiting uniqueness or relative scarcity of similar cultural properties; research potential that surpasses current state of the art; or singular historic importance or architectural interest.

COORDINATED RESOURCE MANAGEMENT PLAN (CRMP). A plan for management of one or more grazing allotments that involve all the affected resources, e.g., range, wildlife, watershed, minerals, and recreation.

CORRIDOR. A linear strip of land forming a passageway between two points in which transportation and/or utility systems exist or may be located. A designated corridor is the preferred location for existing and future rights-of-way grants that have been identified by law, by secretarial order, through land use planning, or by other management decision.

CRITERIA (PLANNING). The standards or rules and other factors developed by the manager and interdisciplinary team for their use in forming judgments about decision making, analysis, and data collection during planning.

CRUCIAL HABITAT. Portions of the habitat of a wildlife population that, if destroyed or adversely modified, would result in a reduction of the population to a greater extent than destruction of other portions of the habitat.

CRITICAL HABITAT. Any air, land, or water area, including elements thereof, which have been determined (and published in the Federal Register) to be essential to the survival of wild populations of an endangered or threatened species or to be necessary for their recovery to a point at which the measures provided pursuant to the ESA are no longer necessary.

CULTURAL RESOURCE. The fragile and nonrenewable remains of human activity, occupation, or endeavor reflected in districts, sites, structures, buildings, objects, artifacts, ruins, works of art, architecture, and natural features that were of importance in human events. These resources consist of physical remains, areas where significant human events occurred even though evidence of the event no longer remains, and the environment immediately surrounding the actual resource and oral history or ethnographic accounts of lifeways and customs.

DESIGNATION. The official identification and naming of a general area or site on public land. Lands may be designated when they are either (1) withdrawn, (2) given special status by act of Congress, or (3) established by an approved land use plan.

DESIGNATED USES. Surface water uses specified by the Water Quality Control Commission for which water quality standards have been established. Designated uses apply whether or not they are being attained.

DESIRED PLANT COMMUNITY (DPC). The plant community which provides the vegetation attributes required for meeting or exceeding RMP vegetation objectives. The DPC must be within an ecological site's capability to produce these attributes through natural succession, management action, or both. A specific description of the vegetation needed to meet the vegetation objectives of a detailed activity plan or implementing action can be described as a desired plant community.

DISTRICT. The specific area of public lands administered by a district manager.

DIVERSION. A man-made construction that diverts water from its natural source to be put to beneficial use.

DIVERSITY. The relative degree of abundance of wildlife species, plant species, communities, habitats, or habit features per unit area.

ECOLOGICAL SITE INVENTORY (ESI). The effort and documentation needed to establish realistic, achievable, and measurable vegetation management objectives.

ECOSYSTEM. A complex self-sustaining natural system which includes living and nonliving components of the environment and the circulation of matter and energy between organisms and their environment.

ELECTROTELLURIC SURVEYING (ET). A geophysical exploration method that utilizes a passive surface detector to measure electrotelluric radiation. The surveying instruments are self-contained and can be transported by a single operator. It can detect voids a varying and specific depths.

ENDANGERED SPECIES (FEDERAL). An animal or plant species whose prospects of survival and reproduction are in immediate jeopardy and in danger of extinction throughout all or a significant portion of its range, as defined by the USFWS under the authority of the Endangered Species Act of 1973, as amended.

ENDANGERED SPECIES (STATE). Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) over utilization for commercial, sporting, scientific, or educational purposes; (3)disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors.

State (Group I): species whose prospect of survival or recruitment in the State are in jeopardy in the foreseeable future.

State (Group II): species whose prospect of survival or recruitment within the State may become jeopardized in the foreseeable future.

ENVIRONMENTAL ASSESSMENT (EA). The procedure for analyzing the impacts of some proposed action on a given environment and the documentation of that analysis. An EA is similar to an environmental impact statement (EIS) but is generally smaller in scope. An EA may be preliminary to an EIS.

ENVIRONMENTAL IMPACT STATEMENT (EIS). The procedure for analyzing the impacts (both beneficial and adverse) of a proposed action on a given environment, and the documentation of that analysis.

EPHEMERAL STREAM. A stream that flows in direct response to surface runoff.

EPHEMERAL. A stream or portion of a stream that flows in direct response to precipitation, lasts for a short period of time and is not influenced by ground water sources. Also pertains to playa lakes which can be intermittently wet.

EXCHANGE. A trading of public lands (surface or subsurface estates) that usually do not have high public value, for lands in other ownerships which do have value for public use, management and enjoyment. The exchange may be for the benefit of other Federal agencies as well as BLM.

EXCLUSION AREAS. Areas where future rights-of-way may be granted only when mandated by law.

EXTENSIVE RECREATION MANAGEMENT AREAS (ERMA). Areas where recreation is unstructured and dispersed and where minimal recreation-related investments are required. ERMAs provide recreation visitors the freedom of choice with minimal regulatory constraint. These areas consist of the remainder of land areas not included in Special Recreation Management Areas within a resource area.

FEDERAL CAVE RESOURCES PROTECTION ACT (FCRPA) OF 1988. The purposes of this act are (1) to secure, protect, and preserve significant caves on federal lands for the perpetual use, enjoyment, and benefit of all people; and (2) to foster increased cooperation and exchange of information between governmental authorities and those who utilize caves located on federal lands for scientific, education, or recreational purposes.

FEDERAL RESERVED WATER RIGHT. A water right which is reserved by the federal government when land is withdrawn from the public domain for a particular purpose, such as national parks, forests, and monuments. The amount of water reserved is only that necessary to fulfill the intended purpose.

FEDERAL LAND POLICY AND MANAGEMENT ACT (FLPMA) OF 1976. Public Law 94-579, gives the BLM legal authority to establish public land policy; to establish guidelines for administering such policy; and to provide for the management, protection, development, and enhancement of the public land. Often referred to and pronounced "FLIPMA."

FRAGILE SOIL. A soil that is easily damaged by use or disturbance. Examples include soils that are susceptible to compaction or other mechanic damage to their structure, or soils that are highly erodible when disturbed.

FULL WILDLIFE SUPPRESSION. All necessary resources and tactics are utilized to halt fire spread at a minimum acreage with the most cost effect suppression tactics.

GEOGRAPHIC INFORMATION SYSTEM (GIS). Through the use of computer technology, GIS allows the input, storage, analysis, and display of a great volume and variety of physically locatable data (i.e., data which is known to exist at some specific place or area on the ground).

GRANT. A gift of public lands either in quantity or in place. Also, the document or the action which conveys land or an interest in land.

GRAZING CAPACITY. The maximum livestock stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates factors such as suitability of the rangeland for grazing as well as the proper use which can be made on all of the plants within the area. Normally expressed in terms of acres per animal unit month (AC/AUM) or sometimes referred to as the total AUMs that are available in any given area, such as an allotment. Areas that are unsuitable for livestock use are not computed in the grazing capacity. Grazing capacity may or may not be the same as the stocking rate.

GRAZING DISTRICT. Means the specific area within which the public lands are administered under Section 3 of the Taylor Grazing Act. Public lands outside grazing district boundaries are administered under Section 15 of the Taylor Grazing Act.

GROUND PENETRATING RADAR (GPR). A geophysical exploration method that has been used successfully to detect shallow tunnels. Using the proper power level, GPR may be used in gypsum karst areas or shallow limestone areas.

GROUND WATER. Subsurface water contained in interconnected pores between soil or rock particles in a zone of saturation. Groundwater includes underground lakes and streams in karst areas.

HABITAT. The place where an animal or plant normally lives during its life cycle often characterized by dominant food, cover, water, and space (e.g., the stream habitat, the forest habitat).

HABITAT MANAGEMENT PLAN (HMP). A written and officially approved plan for a specific geographical area of public land which identifies wildlife habitat and related objectives, establishes the sequence of actions for achieving objectives, and outlines procedures for evaluating accomplishments.

HAZARDOUS MATERIAL. Any substance posing a threat to the health or safety of persons or the environment. These include any material that is toxic, ignitable, corrosive or radioactive.

HIGH RESOLUTION SEISMIC REFLECTION SURVEY. A geophysical exploration method that results in a small three dimensional survey and, if a void is detected, can give an operator an idea of how far an oil and gas well can be moved.

INFORMATION (ARCHAEOLOGY). A level of management applied to cultural resources. Most sites fall into this category and would be studied for the information that could be retrieved from them. The process of extracting information often destroys the site. These sites could be lithic scatters, campsites and other types of sites.

INSTREAM FLOW. The surface streamflow that is necessary to maintain resources such as water quality, fisheries, recreation, and riparian habitat. Usually expressed in terms of minimum flow requirements.

INTERMITTENT STREAM. A stream that does not flow year round but has some association with ground water for surface or subsurface flows.

ISSUE (PLANNING). Significant or important items of concern relating to a proposed action gained through the scoping process to be addressed in the analysis. Issues may be couched in terms of an unrealized opportunity, an unresolved conflict or problem, or a value being lost. For the purposes of this planning document, a planning issue will be related to resource management and will be resolved through the RMP.

LEASE. An authorization to possess and use public land for a fixed period of time (usually long-term). Also, any contract, profit-share arrangement, joint venture, or other agreement issued or approved by the United States Government under a mineral leasing law that authorizes exploration for, extraction of, or removal of oil and gas resources.

LENTIC. Pertaining to static, calm, or slow-moving water or aquatic habitats, such as a marsh.

LEK. A specific area (also termed display, gobbling, booming or strutting grounds) where two or more prairie chicken cocks congregate, typically year after year, for courtship displays in early spring, and vary in size from one-eighth acre to several acres.

LOCATABLE MINERALS. Minerals subject to disposal and development through the Mining Law of 1872 (as amended). Includes all "valuable mineral deposits" including metallic and nonmetallic minerals such as gold, lead, barite, fluorspar or high calcium limestone. It also includes uncommon varieties of sand, stone, gravel, cinders, pumice, pumicite and clay. Also included are all valuable minerals that are not excluded under the leasable and salable minerals.

LOTIC. Pertaining to fast-moving water, such as rivers and streams.

MALPAIS. A Spanish word meaning rough country underlain by dark basaltic lava.

MANAGEMENT FRAMEWORK PLAN (MFP). A planning decision document now replaced by RMPs that establishes for a given planning area land use allocations, coordination guidelines for multiple use, and management objectives to be achieved for each class of land use or protection.

MODERN URBAN (U). Areas with recreation opportunities to experience affiliation with individuals and groups are prevalent as in the convenience of sites and opportunities. Experiencing the natural environmental, and the use of outdoor skills are largely unimportant. One of the six classes of the Recreation Opportunity Spectrum (ROS).

MOIST SOILS MANAGEMENT. Water level manipulation (drawdown) used as a wetland management tool for pastures to optimize food production for waterfowl.

MINERAL MATERIALS. Minerals such as common varieties of sand, stone, gravel, pumice, pumicite and clay which are not obtainable under the mining or leasing laws but which can be obtained under the Materials Act of 1947, as amended. Also known as saleable minerals.

MULTIPLE USE MANAGEMENT. Management of public lands and their various resource values so they are used in the combination best meeting the present and future needs of the American people. Such a concept allows for the most judicious use of some or all of the resources over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions. Relative resource values are considered, not necessarily the combination of uses that would give the greatest potential economic return or the greatest unit output.

NATIONAL REGISTER OF HISTORIC PLACES. A list of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture.

NATIONAL TRAILS SYSTEM. The National Trails System is composed of four types of trails: (1) national recreation trails; (2) national scenic trails; (3) national historic trails; and (4) connecting or side trails. National recreation trails provide for numerous outdoor recreation activities in a variety of urban, rural, and remote areas. They may be designated by the Secretary of the Interior or by the Secretary of Agriculture where lands administered by that agency are involved.

NATURAL-POTENTIAL METHOD (NP). A geophysical exploration method using the naturally occurring electrical currents in the ground. These currents give rise to a natural potential (NP) distribution of electrons to the surface that can be detected by means of electrodes and a voltage-measuring device. Cave passages often focus the natural potential, resulting in anomalies mapped at the surface.

NONPOINT SOURCE POLLUTION (NPS). The alteration of waters by activities not regulated as point sources, which degrade the quality or adversely affect the biological community inhabitating the waters.

NO SURFACE OCCUPANCY (NSO). A condition of surface use attached to a lease or other authorization applied to minerals exploration and development which prohibits occupancy of only the land surface or to protect other identified resource values.

OFF-HIGHWAY VEHICLE (OHV). Any motorized vehicle designed for or capable of cross-country travel on or immediately over land, water, sand, snow, ice, marsh, swampland, or other terrain.

Open: Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner not causing, or unlikely to cause significant, undue damage to or disturbance of the soil, wildlife, wildlife habitat, improvements, cultural, or vegetative resources of other authorized uses of the public lands.

Limited: Designated areas and trails where the use of an OHV is subject to restrictions, such as limiting the number on types of vehicles allowed, or dates and times of use (seasonal restrictions); limiting use to designated roads and trails. Combinations of restrictions are possible, such as limiting use to certain types of vehicles during certain times of the year.

Closed: Designated areas, roads, and trails where the use of an OHV is permanently or temporarily prohibited. Emergency use of vehicles is allowed.

ONE HUNDRED-YEAR FLOOD. The flood that will be equaled or exceeded an average of once every one hundred years; i.e. the flood that has a one percent chance of being equaled or exceeded in any given year.

ONE HUNDRED-YEAR FLOODPLAIN. The area adjacent to a stream or body of water that would be inundated at the peak of the one hundred-year flood. The floodplain delineated on Flood Insurance Rate Maps (FIRMs) or Flood Hazard Boundary Maps (FHBMs) published by the Federal Emergency Management Agency will be used for management purposes. When a FIRM or FHBM map is not available for the area of interest, the best available information will be used.

PAYMENT IN LIEU OF TAXES (PILT). Payments to local or state governments based on ownership of federal land and not directly dependent on production of outputs or receipt sharing.

PERENNIAL STREAM. Surface water normally flows throughout the year except during infrequent years of drought.

PERMIT (GRAZING). A document authorizing use of the public lands within grazing districts under Section 3 of the Taylor Grazing Act for the purpose of grazing livestock.

PERMIT (LAND). A short-term (generally under 3 years), revocable authorization to use public lands for specific purposes.

PETROGLYPH. A form of rock art manufactured by incising, scratching, or pecking designs into rock surfaces.

PHREATOPHYTE. A type of plant common to arid regions which has an extensive root system to draw water directly from the water table.

PLAYA. A shallow, nearly level, often saline, dry lake bed. Playas vary considerably in materials, salinity, and hydrologic regime. In general, playas: (1) collect surface runoff in closed basins; (2) are poorly vegetated; (3) are ephemerally flooded; and (4) have a thin surface of nongravelly, fine-textured sediment.

POINT SOURCE POLLUTION. Pollution discharged from any discernible, confined, and discrete conveyance into a water body; e.g., effluent from a pipe. Point source pollution does not include return flow from irrigated agricultural land.

PRECIPITATION. Any or all forms of water particles, liquid or solid, that fall from the atmosphere and reach the ground.

PRESCRIBED FIRE OR BURN. The skillful application of fire to natural fuels under conditions of weather, fuel moisture, soil moisture, etc., that would allow confinement of the fire to a predetermined area and at the same time produce the intensity of heat and rate of spread required to accomplish certain planned benefits to one or more objectives of wildlife management, livestock management, hazard reduction, etc. Its objective is to employ fire scientifically to realize maximum benefits at minimum damage and acceptable cost.

PRESCRIPTION. A written statement defining objectives to be attained as well as temperature, humidity, wind direction and wind speed, fuel moisture content, and soil moisture under which a fire will be allowed to burn, generally expressed as acceptable ranges of the various indices, and the limit of the geographic area to be covered.

PRIMITIVE (P). Areas with recreation opportunities for isolation from the sights and sounds of man, to feel a part of the natural environmental, to have a high degree of challenge and risk, and to use outdoor skills. One of the six classes of the Recreation Opportunity Spectrum (ROS).

PUBLIC LANDS. Any land and interest in land (outside of Alaska) owned by the United States and administered by the Secretary of the Interior through the Bureau of the Land Management.

PUBLIC VALUES AND INTERPRETATION (ARCHAEOLOGY). A level of management of cultural sites which contribute to the belief systems and folkways of a cultural group such as locations having religious significance. Public interpretive sites would have qualities that would lend themselves to being utilized as recreation, education, and interpretive areas.

QUARRYING (MINING). The extraction of building stone or other valuable nonmetallic constituent from a surficial mine, or quarry.

RANGELAND. Land used for grazing by livestock and big game animals on which the vegetation is dominated by grasses, grass-like plants, forbs, or shrubs.

RANGE IMPROVEMENT. An authorized activity or program on or relating to rangelands which is designed to improve production of forage; change vegetative composition; control patterns of use; provide water; stabilize soil and water conditions; and provide habitat for livestock, wild horses and burros, and wildlife. The term includes, but is not limited to structures, treatment projects, and use of mechanical means to accomplish the desired results.

RAPTOR. A bird of prey, such as an eagle, hawk, or owl.

RECLAMATION. The reconstruction of disturbance by returning the land to a condition approximate or equal to that which existed prior to disturbance, or to a stable and productive condition compatible with the land use plan. The immediate goal of reclamation is to stabilize disturbed areas and protect both disturbed and adjacent undisturbed areas from unnecessary degradation.

RECREATION AND PUBLIC PURPOSES ACT (R&PP). The Act of June 14, 1926, as amended (43 U.S.C. 869, 869-4). Allows the disposal of public lands to any state, local, federal, or political instrumentality or nonprofit organization for any recreational or public purpose, at the discretion of the authorized officer.

RECREATION OPPORTUNITY SPECTRUM (ROS). A continuum used to characterize recreation opportunities in terms of setting, activity, and experience opportunities. Six classes are included: primitive (P), semi-primitive nonmotorized (SPNM), semi-primitive motorized (SPM), roaded natural (RN), rural (R), and modern urban (U). Refer to the individual definitions in this glossary.

RESERVATION. A withdrawal of a permanent nature, dedicated to a specific public purpose.

RESISTIVITY SURVEY. A simple geophysical method used to detect conductive ore bodies that is occasionally used to detect caves at depths up to about 100 feet. By moving two electrodes apart and inducing an electrical current into the ground, the resistivity of the soil and rock between the two electrodes can be measured. The electrical current moves in an elliptical path between the electrodes. The depth of penetration is half the electrode spacing. Therefore, to detect a cave 100 feet beneath the surface, the electrodes would have to be spaced 200 feet apart. (Much below 100 feet, the resolution is relatively poor.)

RESOURCE AREA (RA). The smallest administrative subdivision of a BLM district. A resource area is administered by an area manager.

RESOURCE MANAGEMENT PLAN (RMP). A written land use plan that outlines BLM's decisions and strategies for management of the resources in a particular area. The RMP has been used by the BLM since 1980.

RESTRICTED AREAS. Areas where mitigation such as seasonal restrictions is required to protect resource values.

RIGHT-OF-WAY (ROW). The legal right for use, occupancy, or access across land or water areas for a specified purpose or purposes. Also, the lands covered by such a right. Examples are roads, powerlines, pipelines, water wells, and communities sites. It does not grant an estate of any kind.

RIPARIAN. Situated on or pertaining to the bank of a river, stream, or other body of water. Normally used to refer to the plants of all types that grow rooted in the water table or streams, ponds, springs, etc.

RIPARIAN AREAS. Riparian areas are a form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil.

ROADED NATURAL (RN). Areas with about equal recreation opportunities for affiliation with other user groups and for isolation from sights and sounds of humans. Involves the opportunity to have a high degree of interaction with the with the natural environmental. Challenge and risk opportunities are not very important except in specific challenging activities. The practice of outdoor skills may be important. Opportunities for both motorized and nonmotorized recreation are present. One of the six classes of the Recreation Opportunity Spectrum (ROS).

RURAL (R). Areas with recreation opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities. These factors are generally more important than the natural setting. Opportunities for wildland challenges, risk taking, and testing of outdoor skills are unimportant, except in activities involving challenge and risk. One of the six classes of the Recreation Opportunity Spectrum (ROS).

SALEABLE MINERALS. See Mineral Materials.

SCOPING PROCESS. An early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. Scoping may involve public meetings, field interviews with representatives of agencies and interest groups, discussions with resource specialists and managers, written comments in response to news release, direct mailings and articles about the proposed action, and scoping meetings.

SEDIMENT YIELD. A quantitative measure of the total sediment outflow from a watershed over a given period of time at a specified point in the channel. Sediment yield is the difference between the total erosion from slopes, channels, and mass wasting, and the amount of sediment deposited before reaching the specified point in the channel.

SEEPS. Is where ground water percolates to the surface and forms a saturated area.

SEMI-PRIMITIVE MOTORIZED (SPM). Areas with some recreation opportunity for isolation from the sights and sounds of humans, but not as important as for primitive opportunities. Involves the opportunity to have a high degree of interaction with the natural environment, to have moderate challenge and risk, and to use outdoor skills. Provides an explicit opportunity to use motorized equipment while in the area. One of the six classes of the Recreation Opportunity Spectrum (ROS).

SEMI-PRIMITIVE NONMOTORIZED (SPNM). Areas with some recreation opportunity for isolation from the sights and sounds of humans, but not as important as for primitive opportunities. Involves the opportunity to have a high degree of interaction with the natural environmental, to have moderate challenge and risk, and to use outdoor skills. One of the six classes of the Recreation Opportunity Spectrum (ROS).

SINKHOLE. A closed depression formed when the ground surface collapses above voids created by the solution of carbonate or evaporite rocks. Water levels typically fluctuate rapidly in sinkholes because of their close connection to groundwater.

SLOPE. The inclination of the land surface to the horizontal. When expressed as a percent, slope equals the change in elevation divided by the horizontal distance, with the result multiplied by 100 percent. Thus, a slope of 20 percent is a change in elevation of 20 feet for every 100 feet horizontally.

SPRING. Is where water is discharged from a fixed point and the flow usually forms a small channel.

SOLID LEASABLE MINERALS. The chlorides, sulphates, carbonates, borates, silicates or nitrates of potassium or sodium and related products; sulphur in the States of Louisiana and New Mexico and on all acquired lands; phosphate, including associated and related minerals; asphalt in certain lands in Oklahoma; and gilsonite (including all vein-type solid hydrocarbons).

SPECIAL EMPHASIS AREAS. An area containing one or a combination of unique resources or values that receive more intensive management (e.g., ACECs, WSAs, and SRMAs.)

SPECIAL RECREATION MANAGEMENT AREA (SRMA). Areas requiring explicit recreation management to achieve BLM's recreation objectives and to provide specific recreation opportunities. SRMAs are listed in this plan which also define SRMA management objectives. BLM's recreation investments are concentrated in these areas.

SPECIAL STATUS SPECIES. Wildlife and plant species either federally listed or proposed for listing as endangered or threatened, state-listed or BLM-determined priority species.

STATE APPROPRIATIVE WATER RIGHT. A water right licensed by the New Mexico State Engineer once proof of beneficial use is established.

STATE HISTORIC PRESERVATION OFFICER (SHPO). A position within state governments responsible for coordinating state participation in the implementation of the National Historic Preservation Act. This officer serves as an assistant and consultant when identifying cultural properties, assessing effects to them, and considering alternatives to avoid or reduce those effects.

STIPULATION. A requirement, usually dealing with protection of the environment, that is made a part of a lease, grant, or other authorizing document. In the case of oil and gas leases, a provision that modifies standard lease rights and is attached to and made a part of the lease. The following represent the major stipulations on BLM lands:

No Surface Occupancy Stipulation (NSO): A stipulation in which use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values.

Timing Limitation Stipulation: A stipulation which prohibits surface use during specified time periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent, project specific mitigation measures would be insufficient.

Controlled Surface Use Stipulation (CSU): A stipulation in which use and occupancy is allowed (unless restricted by another stipulation), but identified resources values require special operational constraints that may modify the lease rights.

STRUTTING GROUND. Synonymous with Lek.

SURFACE DISTURBANCE. Any action that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation.

SURFACE WATER. All water located at the surface of the land, such as streams, rivers, and lakes.

THERMAL INFRARED (IR) MAPPING. A method of inventory or mapping where infrared (IR) film is used to measure temperature variations of the earth's surface. For example, warm air blowing out of cave entrances on a cold winter day would be easily spotted by thermal scanners. Thermal scanning of karst areas under ideal weather conditions would identify cave entrances, define joints with significant airflow or temperature differences, and could provide information on shallow groundwater.

THREATENED SPECIES. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Whether a species is threatened or endangered is determined by the following factors: (1) present or threatened destruction, modification, or curtailment of its habitat or range; (2) over utilization for commercial, sporting, scientific, or educational purposes; (3)disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors.

TURBIDITY. A condition in water caused by the presence of suspended matter which results in the scattering and absorption of light. Generally, a measure of fine suspended matter in water.

VEGETATION RESOURCE CONDITION OBJECTIVES (VRCO). In general terms the kinds, types, amounts or appearance of vegetation that will provide the goods, values, and services needed on a geographic area.

VEGETATION TREATMENTS. Methods used to manage the growth and spread of vegetation. A vegetative management practice can either be a direct management of the vegetation itself, for example prescribed fire or indirect management like a change in the number of livestock utilizing the vegetation, or a change in the time frames when livestock are utilizing the vegetation.

VERTICAL SEISMIC PROFILING (VSP). A geophysical exploration method that uses an adjacent well to run seismic surveys on the adjacent area. This method is usually used during a well log run before production and may produce a radius of information from 1,000 to 1,200 feet from the well. The distance depends on the surrounding topography and the condition of the existing well bore.

VIABILITY INDEX. A mathematical model used to predict the suitability of a pasture for pronghorn populations using variables such as pasture size, ruggedness number of fall forb species and anticipated fall sheep stocking rate. See Appendix 12.

VISUAL RESOURCES MANAGEMENT (VRM). The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.

VISUAL RESOURCE MANAGEMENT (VRM) CLASSES. VRM Classes are based on relative visual ratings of inventoried lands. Each class describes the different degree of modification allowed to the basic elements of the landscape. The following are the minimum management objective for each class.

Class I: Natural ecological changes and very limited management activity are allowed. Any contrast created within the characteristic landscape must not attract attention. This classification is applied to Visual Areas of Critical Environmental Concern, wilderness areas, wild and scenic rivers, and other similar situations.

Class II: Changes in any of the basic elements (form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen but should not attract attention.

Class III: Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.

Class IV: Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic elements of the landscape.

Rehabilitation Area: Change is needed or change may add acceptable visual variety to an area. This class applies to areas where the naturalistic character has been disturbed to a point where rehabilitation is needed to bring it back into character with the surrounding landscape. This class would apply to areas identified in the scenic evaluation where the quality class has been reduced because of unacceptable cultural modification. The contrast is inharmonious with the characteristic landscape. It may also be applied to areas that have the potential for enhancement; i.e., add acceptable visual variety to an area or site. It should be considered an interim or short-term classification until one of the other VRM class objectives can be reached through rehabilitation or enhancement. The desired visual resource management class should be identified.

WATER QUALITY STANDARD. Regulations which specify designated uses for surface waters of the state, and water quality criteria to protect those uses. Standards are specified by the Water Quality Control Commission, in accordance with Section 303 of the Clean Water Act.

WETLANDS. Areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and which, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, shallows, swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas.

WILDERNESS. The definition contained in Section 2(c) of the Wilderness Act of 1964 is as follows: "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain." Wilderness is an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least 5,000 acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features or scientific, educational, scenic, or historical value.

WILDERNESS AREA (WA). An area formally designated by Congress as part of the National Wilderness Preservation System.

WILDERNESS STUDY AREA (WSA). A roadless area which has been found to have wilderness characteristics.

WILDERNESS CHARACTERISTICS. Those characteristics of wilderness as described in Section 2(c) of the Wilderness Act. These include size, naturalness, solitude, primitive and unconfined type of recreation, and supplemental values.

WILDLIFE. Includes all species of mammals, birds, molluscs, crustaceans, amphibians, reptiles, or their progeny or eggs which, whether raised in captivity or not, are normally found in a wild state. Feral horses and burrows are excluded.

WITHDRAWAL. Removal or withholding of public lands, by statute or secretarial order, from operation of some or all of the public land laws. A mineral withdrawal is the closing of an area to mineral location and development activities. A mineral withdrawal includes public lands potentially valuable for solid leasable minerals, precluding the disposal of the lands except with a mineral reservation clause unless the lands are found not to contain a valuable deposit of minerals.

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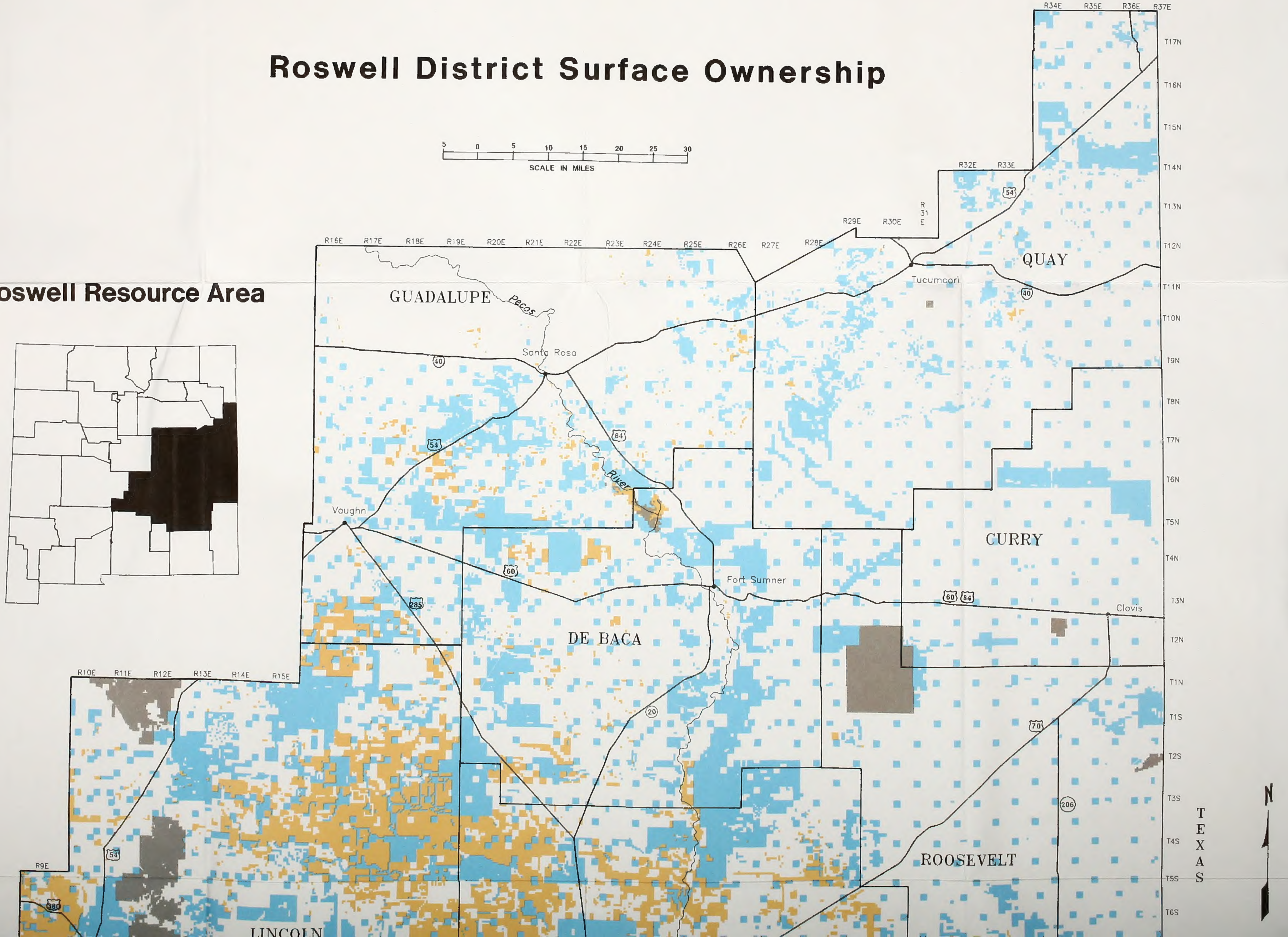

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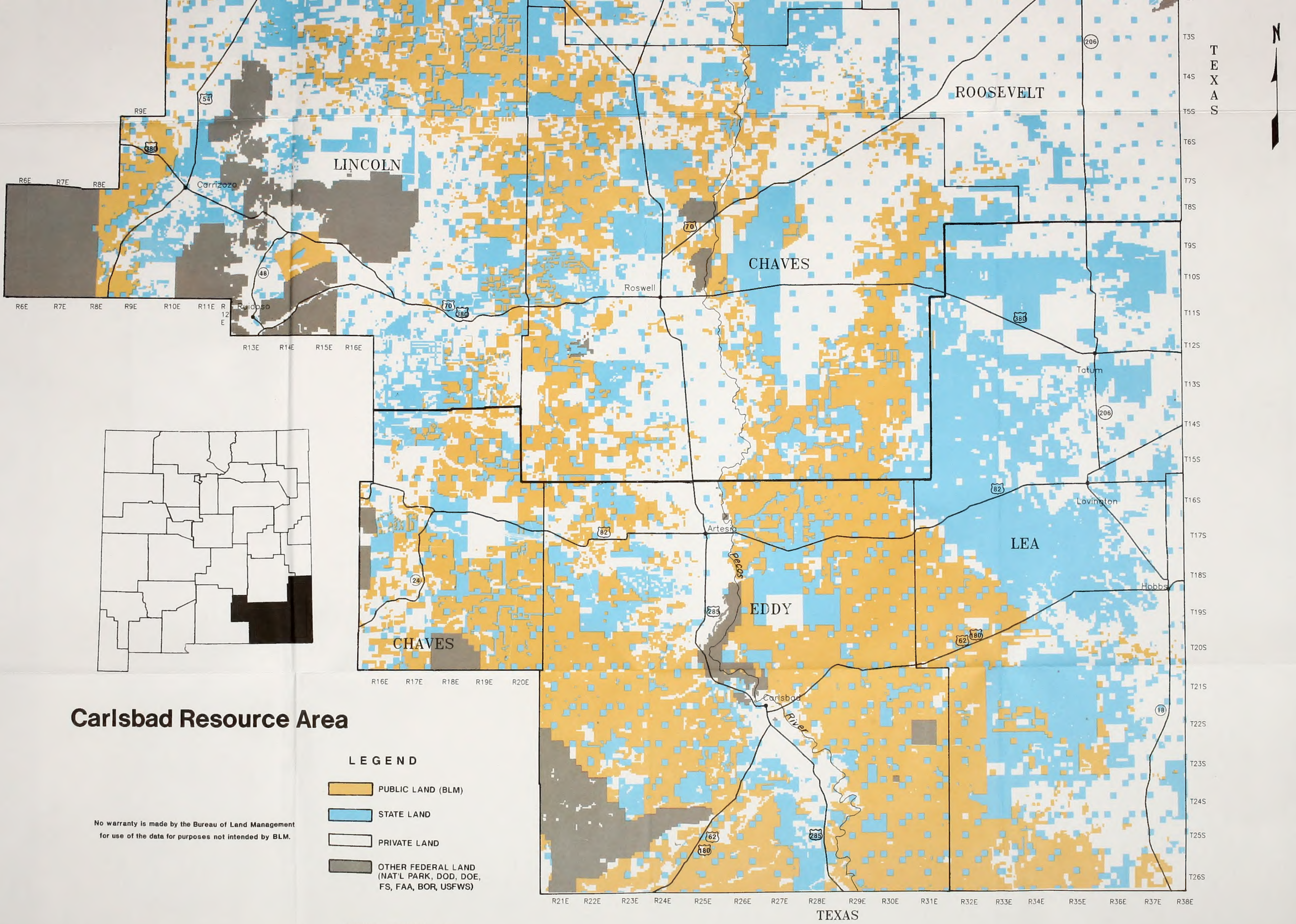

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